

# NAVAL POSTGRADUATE SCHOOL

## Monterey, California



## THESIS

DYNAMIC PRICING POSSIBILITIES IN THE  
PURCHASE OF BULK FUEL FOR THE DEPARTMENT OF  
DEFENSE

by

Kenneth Finley

December 2001

Thesis Advisor:	James M. Barnard
Associate-Advisor:	William R. Gates

Approved for public release; distribution is unlimited

## Report Documentation Page

<b>Report Date</b> 19 Dec 2001	<b>Report Type</b> N/A	<b>Dates Covered (from... to)</b> -
<b>Title and Subtitle</b> Dynamic Pricing Possibilities in the Purchase of Bulk Fuel for the Department of Defense		<b>Contract Number</b>
		<b>Grant Number</b>
		<b>Program Element Number</b>
<b>Author(s)</b> Finley, Kenneth		<b>Project Number</b>
		<b>Task Number</b>
		<b>Work Unit Number</b>
<b>Performing Organization Name(s) and Address(es)</b> Naval Postgraduate School Monterey, California		<b>Performing Organization Report Number</b>
<b>Sponsoring/Monitoring Agency Name(s) and Address(es)</b>		<b>Sponsor/Monitor's Acronym(s)</b>
		<b>Sponsor/Monitor's Report Number(s)</b>
<b>Distribution/Availability Statement</b> Approved for public release, distribution unlimited		
<b>Supplementary Notes</b>		
<b>Abstract</b>		
<b>Subject Terms</b>		
<b>Report Classification</b> unclassified	<b>Classification of this page</b> unclassified	
<b>Classification of Abstract</b> unclassified	<b>Limitation of Abstract</b> UU	
<b>Number of Pages</b> 99		

THIS PAGE INTENTIONALLY LEFT BLANK

<b>REPORT DOCUMENTATION PAGE</b>			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE December 2001		3. REPORT TYPE AND DATES COVERED Master's Thesis
4. TITLE AND SUBTITLE Dynamic Pricing Possibilities in the Purchase of Bulk Fuel for the Department of Defense			5. FUNDING NUMBERS	
6. AUTHOR (S) Kenneth Finley				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not Reflect the official policy or position of the U.S. Department of Defense or the U.S. Government.				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited			12b. DISTRIBUTION CODE	
13. ABSTRACT (maximum 200 words)  <p>The conclusion of the twentieth century and the beginning of the twenty-first century has seen a tremendous explosion in the use of Information Technology (IT) in the business world. One of the latest IT ventures has combined the centuries old auction marketplace Dynamic Pricing mechanism with today's nearly instant communications in the IT environment. The result has been the development of price auctions for products and services via the Internet.</p> <p>United Airlines held a Jet-A reverse auction on February 8, 2001. The auction was for 140,350,000 gallons of Jet-A fuel for delivery to 10 airports and four pipeline terminals.</p> <p>Defense Energy Support Center (DESC) purchases all fuel for the Department of Defense (DoD). DESC's fuel purchase program is similar to United Airlines. To determine the lowest overall laid-in cost for large purchase programs the following must be taken into consideration:</p> <ul style="list-style-type: none"> <li>• Multiple offers/sources for each product</li> <li>• Multiple requiring locations/destinations</li> <li>• Both FOB destination and FOB origin offers</li> <li>• Multiple distribution cost components and options</li> </ul> <p>This research explores the possibility of using Dynamic Pricing via online auctions to purchase bulk fuel for DoD in the same manner as United Airlines.</p>				
14. SUBJECT TERMS reverse auction, dynamic pricing, bulk fuel, bid evaluation model, defense energy support center			15. NUMBER OF PAGES 97	
17. SECURITY CLASSIFICATION OF REPORT Unclassified			16. PRICE CODE	
18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified		19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified		20. LIMITATION OF ABSTRACT UL

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)  
Prescribed by ANSI Std. Z39-18

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release; distribution is unlimited

**DYNAMIC PRICING POSSIBILITIES IN THE PURCHASE OF BULK FUEL  
FOR THE DEPARTMENT OF DEFENSE**

Kenneth Finley  
Lieutenant Commander, United States Navy  
B.S., United States Naval Academy, 1991

Submitted in partial fulfillment of the  
requirements for the degree of

**MASTER OF SCIENCE IN MANAGEMENT**


from the

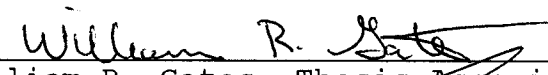
**NAVAL POSTGRADUATE SCHOOL  
December 2001**

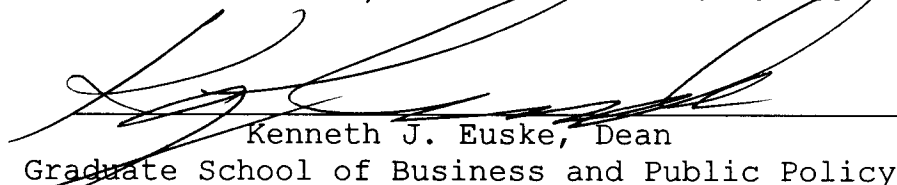
Author:

  
Kenneth Finley

Approved by:

  
James M. Barnard, Thesis Advisor

  
William R. Gates, Thesis Associate-Advisor

  
Kenneth J. Euske, Dean  
Graduate School of Business and Public Policy

THIS PAGE INTENTIONALLY LEFT BLANK

## **ABSTRACT**

The conclusion of the twentieth century and the beginning of the twenty-first century has seen a tremendous explosion in the use of Information Technology (IT) in the business world. One of the latest IT ventures has combined the centuries old auction marketplace Dynamic Pricing mechanism with today's nearly instant communications in the IT environment. The result has been the development of price auctions for products and services via the Internet.

United Airlines held a Jet-A fuel reverse auction on February 8, 2001. The auction was for 140,350,000 gallons of Jet-A fuel for delivery to 10 airports and four pipeline terminals.

Defense Energy Support Center (DESC) purchases all fuel for the Department of Defense (DoD). DESC's fuel purchase program is similar to United Airlines. To determine the lowest overall laid-in cost for large purchase programs the following must be considered:

- Multiple offers/sources for each product
- Multiple requiring locations/destinations
- Both FOB destination and FOB origin offers
- Multiple distribution cost components and options

This research explores the possibility of using Dynamic Pricing via online auctions to purchase bulk fuel for DoD in the same manner as United Airlines.



THIS PAGE INTENTIONALLY LEFT BLANK

## TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	PREFACE.....	1
B.	RESEARCH OBJECTIVE .....	3
C.	RESEARCH QUESTIONS .....	3
	1. Primary Research Question.....	3
	2. Secondary Research Questions.....	3
D.	SCOPE AND ORGANIZATION .....	3
E.	METHODOLOGY.....	4
F.	EXPECTED BENEFITS OF THIS THESIS.....	5
II.	BACKGROUND.....	7
A.	INTRODUCTION .....	7
B.	REVERSE AUCTIONS .....	7
	1. Introduction .....	7
	2. Pricing Process .....	7
	3. Request for Proposal .....	10
	4. Competitive Range .....	10
	5. Responsive and Responsible.....	11
	6. Auction or Conventional Method.....	11
	7. Award Contract Using Best Value Or Lowest Price.....	13
	8. The Bidding Process .....	15
	9. Advantages to Government .....	16
	10. Potential Disadvantages to Government .....	17
	11. Buyer-Seller Relations .....	19
	12. Advantages to Industry .....	21
	13. Disadvantages to Industry.....	22
	14. Socioeconomic Goals .....	23
C.	DYNAMIC PRICING IN THE BULK FUELS COMMERCIAL MARKET.....	24
D.	BULK FUEL MANAGEMENT WITHIN THE FEDERAL GOVERNMENT.....	27
	1. Inventory and Distribution Management Division (DESC-BI) .....	28
	2. Contracting Division (DESC-BZ).....	29
	3. Quality Operations Division (DESC-BQ) .....	29
	4. Product Technology and Standardization Division (DESC-BP) .....	30
E.	SUMMARY.....	30
III.	COMMERCIAL AND DOD BULK FUELS ACQUISITION PROGRAMS ....	33
A.	INTRODUCTION .....	33
B.	DESC/DOD BULK FUELS PROGRAMS .....	33

1.	Demand Forecasting .....	34
2.	Preaward.....	37
3.	Effects of the BEM on the Award Process .....	40
C.	COMMERCIAL AIRLINE PRACTICES FOR BUYING BULK FUEL	46
D.	CONCLUSION.....	46
IV.	ANALYSIS .....	49
A.	INTRODUCTION.....	49
B.	OPINIONS AND CONCERNS OF THE CURRENT PROCESS PARTICIPANTS .....	49
1.	Socioeconomic Concerns .....	49
2.	Lowest Total Program Cost vs. Lowest Single Source of Fuel Cost .....	52
3.	Higher Prices? .....	57
4.	Time Concerns .....	59
5.	Product Sales .....	61
C.	SUMMARY.....	61
V.	CONCLUSIONS AND RECOMMENDATIONS .....	63
A.	SUMMARY AND REVIEW OF RESEARCH QUESTIONS .....	63
1.	Primary Research Question.....	63
2.	Secondary Research Questions.....	63
B.	CONCLUSIONS.....	64
C.	RECOMMENDATIONS .....	65
D.	SUGGESTED FURTHER STUDIES .....	67
APPENDIX A.	DESC SUPPLIER SURVEY RESPONSES.....	69
APPENDIX B.	DESC WORKFORCE RESPONSES .....	71
APPENDIX C.	REVERSE AUCTION SURVEY (DESC).....	77
APPENDIX D.	REVERSE AUCTION SURVEY (SUPPLIERS) .....	79
LIST OF REFERENCES.....		81
INITIAL DISTRIBUTION LIST .....		83

## LIST OF FIGURES

Figure 1.1	Reverse Auctions (From Ref. 9).....	2
Figure 2.1.	Simplified Procurement Process (From Ref. 9).....	9
Figure 2.2.	Five Reverse Auctions Savings (From Ref. 9).	16
Figure 3.1.	DESC Bulk Fuels (From Ref. 3).....	33
Figure 3.2.	Major DFAMS Applications (From Ref. 14). ....	34
Figure 3.3.	Requirements Process (From Ref. 14).....	36
Figure 3.4.	Pre-award Process (From Ref. 14).....	38
Figure 3.5.	Award Process, (From Ref. 14).....	40
Figure 3.6.	Methods of Transporting Bulk Fuel to End Users (From Ref. 14). ....	42
Figure 3.7.	DESC East/Gulf Coast Region (From Ref. 14)..	43
Figure 3.8.	East/Gulf Coast JP5 Evaluation (After Ref. 14).....	45
Figure 4.1.	Typical Dynamic Auction (From Ref. 9).....	53
Figure 4.2.	BEM Bid Evaluation Sheet (From Ref. 7).....	55
Figure 4.3.	BEM Summary of Award Information (From Ref. 7).....	56
Figure 4.4.	BEM Rate Report (From Ref. 7).....	56

THIS PAGE INTENTIONALLY LEFT BLANK

## LIST OF TABLES

Table 2.1.	Reverse Auction Summary (From Ref. 9) . . . . .	12
------------	---	----

THIS PAGE INTENTIONALLY LEFT BLANK

## **ACKNOWLEDGEMENTS**

I would like to thank the Almighty, friends, and family for the undying support, love, and patience over the years, but especially during this tremendous educational experience. No matter how far or near, never was I alone, and I appreciate that. Jeff Finley, you are my hero.

Thanks a million to CDR Barnard and Dr. Gates for working with me on this project. Your insight and guidance were invaluable. The two of you made the entire process interesting and not just a chore. Thanks again.



THIS PAGE INTENTIONALLY LEFT BLANK

## **I. INTRODUCTION**

### **A. PREFACE**

The conclusion of the twentieth century and the beginning of the twenty-first century has seen a tremendous explosion in the use of Information Technology (IT) in the business world. One of the latest IT ventures has combined the centuries old auction marketplace Dynamic Pricing mechanism with today's nearly instant communications in the IT environment. The result has been the development of price auctions for products and services via the Internet.

During this same period of time, the Federal Government has been going through a self-reinvention process to capture significant efficiencies in how it does business. Within this reinvention initiative, the Federal acquisition process has been on a constant lookout for ways to do business faster, better, and cheaper. Recognizing the efficiencies gained by embracing the power of the IT revolution and also looking for innovative ways to engage the commercial marketplace, the Federal Government has begun exploring Internet auctions for its day-to-day business.

Two types of auctions exist; reverse and forward. A reverse auction is defined as

'downward price' auctions in which suppliers continue to lower their prices until the auction closes. Buyers watch as anonymous competitors lower prices in real time. (Dollase)



# Reverse Auctions



**Suppliers**

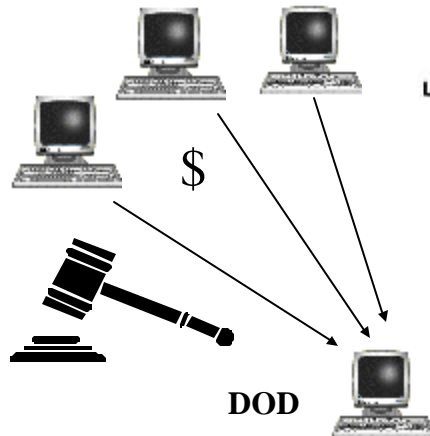


Figure 1.1 Reverse Auctions (From Ref. 9).

Conversely, forward auctions are 'upward price' auctions in which buyers compete by raising their prices until the highest bid is obtained.

Within Federal Government acquisitions, the Department of Defense's (DoD's) Defense Energy Support Center (DESC) procures approximately \$3.2 Billion worth of bulk fuels each year to support DoD and other Federal Agency operations throughout the world. (Barnard) In this role, DESC is the single largest buyer of bulk petroleum products in the world and is the Defense Logistics Agency's (DLA's) largest acquisition program. Because numerous sellers provide fuel for DoD bulk fuel acquisitions, Dynamic Pricing via reverse auctions potentially offers cost savings to the Government.

## **B. RESEARCH OBJECTIVE**

Given DESC's significant role within the DoD acquisition system and the recent advent of Dynamic Pricing through Internet auctions, the potential exists for DESC to consider Dynamic Pricing auctions in their bulk fuels acquisition program. This research will explore the background of DESC's acquisition processes and the capabilities of Internet based Dynamic Pricing to determine if Dynamic Pricing can be effectively used to purchase of bulk fuel for DoD.

## **C. RESEARCH QUESTIONS**

### **1. Primary Research Question**

- Is the Dynamic Pricing model a viable option for purchasing bulk fuel in the Department of Defense?

### **2. Secondary Research Questions**

- What is the background and history of Dynamic Pricing in Government procurement?
- How does DoD currently buy and sell bulk fuel?
- How is bulk fuel bought and sold in the commercial marketplace?
- What is the background and history of Dynamic Pricing in the commercial bulk fuel market?
- What issues support or limit purchasing bulk fuel with Dynamic Pricing?

## **D. SCOPE AND ORGANIZATION**

The scope of this thesis will include

- A review of past and current Government Reverse Auction applications
- An examination of DESC's current fuel purchase program
- An examination of United Airlines' Jet A auction

- An analysis of steps necessary to employ dynamic pricing procurement in DESC's purchase of DoD fuel

Chapter II provides the history of Dynamic Pricing within the Federal Government and the bulk fuels commercial marketplace. It examines bulk fuel management within the Federal Government while comparing and contrasting with commercial industry practices.

Chapter III explains DESC's bulk fuels acquisition program. DESC's purchase and sales procedures will be examined and commercial bulk fuels purchase procedures reviewed. This chapter concludes by discussing the similarities and differences in the business practices of DESC and the commercial marketplace.

Chapter IV analyzes the steps necessary to incorporate Dynamic Pricing into DESC's bulk fuel purchase procedures and discusses the potential impacts of using auctions to purchase and sell bulk fuel for DoD.

Chapter V makes recommendations as to whether Dynamic Pricing can or cannot be used to purchase bulk fuel for DoD. Research questions are answered and conclusions are summarized. The thesis concludes with suggested areas for further research.

## **E. METHODOLOGY**

This thesis research will include the following steps:

- Conduct a comprehensive literature search of Government reports, magazine articles, Internet based materials and other library information resources.
- Review the DESC, Ft. Belvoir, VA procedures for purchasing bulk fuel

- Conduct interviews, either in person or by telephone, with fuel procurement specialists, market analysts, and senior contracting officials as DESC, Ft. Belvoir, VA
- Conduct interviews, either in person or by telephone, with United Airlines

After compiling all data, conclusions will be drawn and presented that explain why DoD can or cannot use Dynamic Pricing to purchase bulk fuel.

#### **F. EXPECTED BENEFITS OF THIS THESIS**

This thesis will primarily benefit the DoD by determining if Dynamic Pricing presents a viable option to purchase and sell bulk fuels. The specific benefits will be a thorough analysis of the issues involved in using Dynamic Pricing in DESC's bulk fuels acquisition program. This will enable DESC leadership to make an educated decision on whether or not to pursue Dynamic Pricing.

THIS PAGE INTENTIONALLY LEFT BLANK

## **II. BACKGROUND**

### **A. INTRODUCTION**

This background chapter reviews the history of Dynamic Pricing in the Federal Government, uses of Dynamic Pricing in the bulk fuels commercial marketplace, and bulk fuel management within the Federal Government. The chapter concludes by comparing and contrasting Federal Government and commercial business practices when buying bulk fuel.

### **B. REVERSE AUCTIONS**

#### **1. Introduction**

A revolutionary procurement tool called Dynamic Pricing has emerged into Government acquisition. Dynamic Pricing, in the form of Reverse Auctions and Forward Auctions, promises huge Government savings in time and money while potentially increasing competition. The purpose of this research is to determine whether Dynamic Pricing is an effective tool that offers substantial benefits to the Government for procuring and/or selling bulk fuels. .

#### **2. Pricing Process**

An auction, either reverse or forward, is a process that involves approved offerors submitting bids to an enabler. An enabler is a company that is contracted as an auctioneer. Freemarkets has been the enabler in several U.S. Navy acquisitions (Dollase). The enabler electronically shows the bid to all the offerors. The offeror's name is kept confidential (FAR Part 15.505). Government buyers are able to view the offeror's names. Auctions are new, however, some basic acquisition requirements have been established that include:



- Suppliers must be pre-screened and approved by the Government. All qualifying suppliers are determined to be in the competitive range.
- Suppliers submit technical offers to the buyers and are issued passwords into that particular auction
- Only those suppliers who were provided passwords can participate or view the auction
- All offerors maintain anonymity to all, except the Government buyers
- All participants see a bidder number, not the competition's names
- The buyers' evaluation criterion can be based on either price or best value. (Roll)

Reverse auctions began for U.S. Navy acquisitions after several reverse auctions were held in Pennsylvania with Freemarkets as the enabler. The Naval Inventory Control Point (NAVICP) introduced the reverse auction concept as a result of a meeting brokered by Department of the Navy (DON) Chief Information Officer (CIO), Mr. Dan Porter, on 22MAR00. Mr. Porter had previous discussions with Freemarkets and felt that there could be some applicability for reverse auctions within Navy acquisition. (Murphy)

While discussions favored procuring berthing equipment for shipboard upgrades, the first item procured with a reverse auction was recovery sequencers for aircraft ejection seats (Dollase). NAVICP officials saw reverse auction as a tool that could increase competition and dramatically decrease prices.

As depicted in Figure 2.1, auctions offer an alternative to the buying agency's procurement officials after the contracting officer determines responsiveness and

responsibility. The auction is an extremely useful tool when price and price related factors are the award basis.

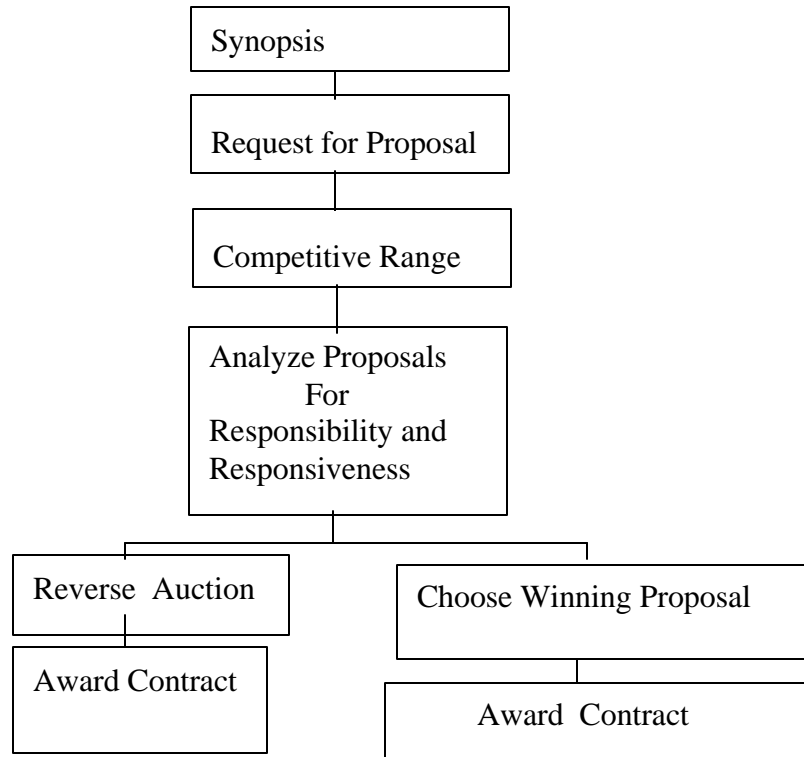


Figure 2.1. Simplified Procurement Process (From Ref. 9).

The synopsis tells potential offerors exactly what is being requested and may also address certain qualifications requirements. Once the procurement is synopsised, it is important, especially in a competitive situation, to allow sufficient time for responses. A synopsis must be published in the Commerce Business Daily (CBD) at least 15 days before issuing of a solicitation; and at least 30 days

response time must be allowed to receive bids (for sealed bids) and proposals (with request for proposals).

### **3. Request for Proposal**

The request for proposal is a type of solicitation where a proposal constitutes an offer that Government can accept to create a binding agreement. (FAR Part 15.201)

### **4. Competitive Range**

The next crucial step in the procurement process is determining the competitive range. Some guidelines for determining if a proposal is not in the competitive range include:

- It modifies or fails to conform to the solicitation's essential requirements or specifications to such an extent that it has no chance of being revised sufficiently to become a winner;
- It does not represent a reasonable effort to address the solicitation's essential requirements or clearly demonstrates that the offeror does not understand the solicitation's requirements;
- It contains design deficiencies of such magnitude that the necessary proposal correction or improvement would require a major revision or virtually an entirely new technical proposal; or,
- It contains such major technical or business deficiencies or omissions, including unrealistic Pricing, that discussions with the offeror could not reasonably be expected to make it a winner.  
(Abney)

If an offeror is outside the competitive range, the contracting officer must notify the offeror. The contracting officer has to tell the offeror as soon as possible that their proposal will no longer be considered for award (Abney). With auctions, offerors outside the competitive range are not allowed to participate. An

offeror who is in the competitive range and allowed to participate receives a password authorizing them to view the price bidding. If an offeror receives a password they are only allowed to see the current price and a bidder number. The actual name of the company with the best priced bid (i.e. the lowest in a reverse auction and the highest in a forward auction) is confidential. Only the enabler and buying agency know all of the participants. The buying agency is not allowed to share the participants' names with other offerors. (FAR Part 15.505)

#### **5. Responsive and Responsible**

An offeror is determined to be responsive when the response to the request for proposal is without deviations and exceptions. Non-responsive proposals only apply in sealed bidding. In competitive negotiated procurements responsiveness is not an issue because proposals can become responsive as a result of discussions. (FAR Part 15.201)

An offeror is responsible if they are capable with capacity, have proven past performance, have no violations of trust or dishonesty, and are not on the debarred, suspended, or ineligible list. (FAR Part 9.104-1)

#### **6. Auction or Conventional Method**

Once proposals are analyzed for responsiveness and responsibility, the contracting officer (CO) has the option of using an auction or choosing the winning proposal by the conventional methods. The CO could contract and award by negotiation methods. (FAR Part 15) Alternatively, the CO can use an auction, as it does not constitute a violation of the FAR (Dollase). The CO must exercise caution to conform to the FAR and sealed bid method of procurement

requirements. Sealed bidding shall be used if the following conditions exist:

- Time permits the solicitation, submission, and evaluation of sealed bids
- The award will be made on the basis of price and other price-related factors
- It is not necessary to conduct discussions with the responding offerors about their bids
- There is a reasonable expectation of receiving more than one sealed bid. (FAR Part 6.401(a))

As these conditions indicate, the sealed bid method is extremely structured. With a sealed bid procurement, either a Firm Fixed Price or Firm Fixed Price with Economic Price Adjustment type contract must be used.

However, price is not always the only factor used when awarding the contract. Table 2.1 summarizes five reverse auctions held for the U.S. Navy, U.S. Air Force, and Bureau of Medicine. (Dollase)

Item	Requiring Activity	Evaluation Criteria	Date	Results
Recovery Sequencers	USAF	Price Only	5 May	\$932K or 28%
Shipboard Berthing	NAVICP	Technically Acceptable/Low Price	30 June	\$2.8M or 22% over 5 years
T-56 Engine Blades	NAVICP	Price Only	3 August	\$1.2M or 17% over 5 years
Mobile MRI Services	BUMED	Best Value	18 August	Not awarded to low offeror
CVN Camels	CINLANTFLT	Best Value	7 September	\$9.9M or 27% over 5 years

Table 2.1. Reverse Auction Summary (From Ref. 9).

As shown in Table 2.1, evaluation criteria can include factors in addition to price, but the buyer must make evaluation criteria clear in the solicitation. When contract award will be made based on factors other than price, the sealed bid method cannot be used. (FAR Part 15.101)

#### **7. Award Contract Using Best Value Or Lowest Price**

As shown in Table 2.1, procurement officials can make contract awards based on best value via auctions. The concept of best value continuum is defined in the FAR and states,

In different types of acquisitions, the relative importance of cost or price may vary. For example, in acquisitions where the requirement is clearly definable and the risk of unsuccessful contract performance is minimal, cost or price may play a dominant role in source selection. (FAR Part 15.101)

The acquisition of medicine and the aircraft support equipment are prime examples of items that involve minimal to no risk. The Government is authorized to weigh factors other than price, such as past performance and technical capability. In a reverse auction case study, LCDR Murphy states, "it is important to note that the lowest bid does not have to be selected for contract award. A 'Best Value' determination can be made prior to contract award." (Murphy)

A best value assessment cannot be arbitrary and capricious. Tradeoffs involving cost and non-cost factors are highly encouraged to allow the Government to obtain high quality goods and services, even if a higher price is paid. The FAR states that, when using a tradeoff process, the following apply:

All evaluation factors and significant subfactors that will affect contract award and their relative importance shall be clearly stated in the solicitation; and

The solicitation shall state whether all evaluation factors other than cost or price, when combined, are significantly more important than, approximately equal to, or significantly less important than cost or price. (FAR Part 15.101-1)

Contracting officers have a responsibility to follow the rules, using common sense without favoritism. If the buying agency feels a best value award should be made, justification must be documented in the procurement files. (Abney)

Best value represents the Government's optimum balance of technical feasibility, performance, and cost. Best value implies that weights on either element, cost or technical excellence, must not be so overriding that the other becomes insignificant. (FAR Part 15.101-1) When contracting officers decide to make an award based on non-cost factors, the offerors must be informed in advance so proposals can be prepared accordingly. Table 2.1 shows a reverse auction for shipboard berthing that was awarded based on the lowest price technically acceptable. The FAR states,

(either add "... " before the or capitalize The)The lowest price technically acceptable (LPTA) source selection process is appropriate when best value is expected to result from selection of the technically acceptable proposal with the lowest evaluated price. (FAR Part 15.101-2)

Just as when using tradeoffs, the lowest price technically acceptable process requires that the solicitation clearly specify the basis for award. However,

unlike best value, FAR Part 15.101-2 dictates that when using the lowest price technically acceptable:

- (1) The evaluation factors and significant subfactors that establish the requirements of acceptability shall be set forth in the solicitation ...
- (2) Tradeoffs are not permitted.
- (3) Proposals are evaluated for acceptability but not ranked using the non-cost/price factors.
- (4) Exchanges may occur (see FAR Part 15.306)

When evaluating the contract award continuum, best value tradeoffs are at one end of the spectrum and lowest price technically acceptable is at the other. The competitive forces of the marketplace must be given full consideration.

#### **8. The Bidding Process**

Once the competitive range has been established, all participants are notified and given their passwords, authorizing them to see the most favorable bid. The opening bid is displayed and participants make counter bids. The buying agency monitors the prices via the enabler. The Government reserves the right to close the bid at their discretion. Buyers.gov officials state,

The Government reserves the right to extend, close or cancel an auction event. Complexity of the commodity and the complexity of the solicitation requirements are two significant considerations. The level of activity in the auction process (especially lots of activity at the very end of the period) would obviously affect the Contracting Officer's decision to extend the auction. (Buyers.gov)



If the period is within 60 seconds of closing and a bid is received, the auction period may be extended to allow a counter bid by all participants. The extension promotes full and open competition and prevents a bidder from waiting until the very end to outbid everyone else. (Thomas)

## 9. Advantages to Government

Acquisition professionals Government-wide are excited about the new procurement tool at their disposal. They are excited because of the potential for cost savings, increased competition, increased sourcing, and time saved during negotiations. (Dollase)

Savings from five reverse auctions are graphed in Figure 2.2.

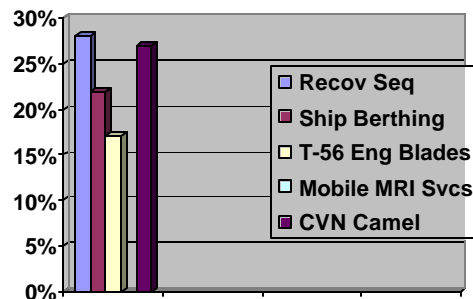


Figure 2.2. Five Reverse Auctions Savings (From Ref. 9).

As shown in Figure 2.1, significant savings have been realized at all Government agencies that have participated in reverse auctions. However, savings are not shown for Mobile MRI services because the contract was not awarded to the lowest bidder. The award was based on best value.

The Government claims to have saved over \$14M from the auctions shown in the graph. The savings are based on

differences between the independent Government cost estimate and final bids. (Dollase)

Because the Government has realized substantial savings, an opportunity arises that could potentially allow the Government to purchase more of the item acquired in a reverse auction. Mr. Steve Timchak, a Buyers.gov program manager, suggested, "that the Government is incurring huge savings and if the solicitation is clear initially, the Government might be able to buy 20%-30% more of an item after the price is settled." (Timchak) This concept would be appropriate for volume purchases. Presently price is based on a pre-determined quantity, but if a binding agreement is made beforehand, the buyer and seller could benefit from increasing the quantity.

Another potential auction advantage to the Government is increased competition. Ideally competition will increase which will help generate the best prices while promoting full and open competition. The sources of supply increase as exposure is increased for new suppliers.

#### **10. Potential Disadvantages to Government**

Healthy competition will force suppliers to efficiently adjust their costs to become more competitive. Better prices are the goal for the Government, but not at the expense of poor quality. After speaking with a small business owner who participated in a reverse auction, he stated, "the competition is so keen that companies are beating each other by cutting corners" (SR Tech) The Government will have to ensure accurate and meticulous records are kept regarding performance. Savings incurred and level of performance should not be inversely related.

If the buyer realizes huge savings the end-user should still receive a quality product or service.

Post award documentation should be scrutinized to allow an accurate evaluation of past performance. Firms are willing to compete, but some will do whatever it takes to win the award even if it means cutting corners or producing in the red. A firm goes in the red when they agree on a price but cut costs too dramatically to win the award. After a phone interview with MICRON Computers, a reverse auction participant, a sales representative expressed that,

they dropped out of the Defense Finance and Accounting Service (DFAS) computer reverse auction because for them to win they would be forced to cut costs too dramatically.(MICRON)

MICRON wanted to retain the business but did not want to be forced to offer decreased service and quality. Even though MICRON dropped out of the computer bidding, they did win an award in the reverse auction for "744 light and 729 heavy-duty printers." (GSA.gov) After dropping out of this bidding, MICRON did not consider the reverse auction to be a negative experience and look forward to participating again.

To prevent nonperformance, contractors will be advised in the solicitation that nonperformance penalties will be imposed. The Buyers.gov website claims that,

the contract vehicle or solicitation should spell out what applicable FAR clauses apply. Typical remedies are consideration, termination for the convenience of the Government, or disbarment. (Buyers.gov)

Contractors cannot afford to have their reputations tarnished by failing to perform. The long-term effects may be more detrimental than the extra effort required to fulfill their contractual commitment. Follow-on awards will be difficult to obtain if past performance carries significant weight in future auctions.

Another potential disadvantage to the Government is that competition could decrease if companies refuse to participate in reverse auctions. In an interview, Mr. Steve Timchak of Buyers.gov stated,

Del Computers did not participate in the DFAS computer reverse auction. The reasons they did not participate are because they don't like competition and the auction was outside their business model, but Del uses the private auction to obtain parts and support of their own company.  
(Timchak)

Unless reverse auctions are going to be mandatory, the number of firms reluctant and those refusing to participate should be monitored. Companies that participated but dropped out during the bidding need to be canvassed to find out if they plan to participate in the future. If a company decides not to participate, the Government needs to document why. The same tool used to increase competition could decrease quality competitors to the point that there is a high quantity of competitors, but they are not high quality competitors. A vibrant and viable supplier base must be maintained and trends of firms dropping out or not appearing on the potential suppliers lists must be acknowledged.

## **11. Buyer-Seller Relations**

The most effective buyer-seller team is characterized by teamwork and collaboration. Adversarial relationships must be eliminated. The Government is apparently realizing significant savings through reverse auctions. Suppliers could choose not to participate or reluctantly participate in a reverse auction because they might not view the auction as a "win-win" situation. Some of the savings stem from profit, therefore, companies could assume an arms length relationship because they feel they are on the losing end of deal before the auction even starts. Dobler and Burt state,

A company's purchasing organization should motivate its suppliers to participate in a mutually profitable buyer-seller relationship. To create such motivation fully, it is essential that both buyer and seller completely understand the mutual advantage of a continuing relationship. (Dobler and Burt, 1996, p. 218)

A supplier could cut costs to compensate for the profit lost and decrease quality or service to compensate. A vicious cycle begins that could include:

- Documenting the poor performance with threats of no follow-on business. For this method to be effective, the supplier must feel they have something to lose from the lack of follow-on business.
- The supplier gets more upset and does not improve because their profit margin is low.
- The buying agency could threaten to terminate for convenience or put the supplier on the disbarred list.
- Other firms could recognize the hostile relationship stemming from decreased profits and avoid Government business, eroding the supplier base as the Government seeks large savings.

## **12. Advantages to Industry**

When considering General Services Administration (GSA) schedule buys, industry is placed at an advantage with private auctions because,

in a GSA Schedule buy environment three quotes are typically sought to conduct an efficient competition.

Buyers.gov has the potential to expand that number significantly and therefore conduct efficient and effective competitions.  
(Buyers.gov)

Industry and competitors are allowed to penetrate an account that was closed before.

Some firms indicated that the enabler used determines the advantages and disadvantages of auctions. For example, the owner of Spec-Built Systems, expressed, "when using Fed-Bid a bid war frenzy is eliminated because the lowest price is not displayed, but whether a firm 'leads or lags' in the bidding." (Spec-Built) In some circumstances, companies may be less inclined to bid 5%-10% under the lowest price if they do not know the exact bid; a company might lower its bid to win the award if it knows the exact price. Showing if a company "leads or lags" rather than showing an exact price may create, more of a "win-win" atmosphere in some circumstances. Further research is needed to determine how bid information affects bidder behavior. Based on this research, better buyer-seller relations can be fostered in situations where both parties feel they are winning.

With the Freemarket model, companies have a tendency to offer a bid that could very well be too low, but, according to a MICRON sales representative, a company could

offer low prices to show sales and growth in their quarterly statements (MICRON). The enabler chosen to conduct the auction could affect the outcome.

Another advantage to companies participating in auctions is that companies are allowed to instantaneously change their bid in response to another company's bid. This aspect of auctions is an advantage to the Government and industry because competition is maximized.

If the buyer is allowed to increase quantities after the price is agreed upon, the buyer is then able to move more inventory that otherwise might have been dead stock or surplus. Firms that have purchased too much of an item can capitalize on the opportunity to eliminate excess. Dobler and Burt state

Excessive 'forward buying' is another common source of surplus materials. Regardless of the reason for using this method of buying, it entails the hazard of surplus generation from obsolescence, deterioration, or excessive inventory. (Dobler and Burt, 1996, p. 604)

Surplus management is critical when attempting to maximize profits and space, while minimizing dead stock due to over-ordering and slow-moving material.

### **13. Disadvantages to Industry**

The biggest disadvantage to industry is when the auction award is based on price only. Some companies have dropped from competition while involved in an auction because they wanted to avoid losing money. In a phone interview, a Gateway sales representative expressed,

Competition is so keen that companies are bidding at a break-even point or below cost to obtain business. Gateway has even removed themselves

when quality would be compromised. (Gateway)

Gateway feels quality and service could suffer in the long run. Companies are engaging in strategic buys that could be detrimental to the buyer.

The owner of Spec-Built emphasized that there is not a standard used in Government auctions. Suppliers feel one clear set of guidelines should be established regarding:

- **Time limits** - when will the bidding stop? Are extensions allowed if a bid is submitted in the last 60 seconds of bidding? When Freemarkets was the enabler, extensions were granted; however, FedBid did not grant extensions. Suppliers would like to counter offers if an offer is made in the last 60 seconds. A common time limit convention needs to be posted and enforced.
- **Right Specifications** - How are specifications sent to the suppliers? With FedBid, specifications are posted on a website bulletin board and are not easily read. The display is difficult to understand, which can lead to confusion and failure to perform. FreeMarkets uses a written request for bid.
- **Write-in bids** - Are write-in votes permissible and if so can the bid be displayed for all to see. The owner of Spec-Built participated in a reverse auction that allowed a write-in bid, but the bid was not made public. Therefore, the other participants could not fairly compete. A write-in bid should be public knowledge. Both the Government and other suppliers benefit from maximum competition.

#### **14. Socioeconomic Goals**

Officials at Buyers.gov are fully aware of the need to promote socioeconomic interests. Even though SR Technologies is a small business that won a significant DFAS contract, the owner feels reverse auctions put him at a disadvantage. The increased competition and decreased



prices can crowd out small business. When the owner of SR Tech was asked how he was able to beat larger businesses in the DFAS printers award, he stated, "I had to be proactive and employ innovative cost-cutting measures in certain areas that big companies did not" (SR TECH) Mr. Timchak of Buyers.gov realizes the need for set-asides and has plans in the near future to use a tool called Efast. Mr. Timchak states, "Efast is an aggregation tool that will compile purchase orders for potential volume buys that will be solely for 8(a) set-asides. (Timchak) Small business concerns can capitalize on the revolutionary procurement tool that will increase their business.

#### **C. DYNAMIC PRICING IN THE BULK FUELS COMMERCIAL MARKET**

The commercial marketplace has begun to use electronic business (e-Business) as a tool for fuel procurement. Several companies in the transportation industry, including United Parcel Service (UPS) and United Airlines, have successfully conducted online auctions to obtain bulk fuel. United and UPS used the American Petroleum Exchange (The Exchange) which is "a single web site that can post, bid, award, dispatch and process term bid business." (Apexchange.com)

Launched October 2, 2000 The Exchange delivers over 412,000 gallons of fuel every business day. Using the exchange allows companies to build on their success, leverage technology and become more efficient in the new e-petroleum landscape. "The Exchange has completed over 300 auctions and awarded 105 million gallons from UPS, FedEx Ground and Consolidated Freightway"(Apexchange.com). The Exchange advertises the following conveniences to their clients:

**One-Stop-Shop for all your fuel procurement needs**

— With a flexible platform to handle many types of transactions from OPIS related or even NYMEX, access to dozens of suppliers, to clearing deals and delivering product all on one easy-to-use website.

**Automated fuel procurement platform** driven by cutting-edge technology provided by Arthur Andersen, Sun Microsystems, Oracle, Remedy, Ariba, and Exodus.

**Dedicated and creative Management Team** with over 150 years' experience in the petroleum industry.

**Supplier Relations Team** to analyze your offers and put you in touch with potential buyers.

**Streamlined Back-Office Solution** staffed with a team of professionals to electronically link all your invoices, payments, contracts, credit, dispatching, and paperwork.

**Your own personal Liquidity Manager** to help you with your procurement strategies and walk you through every transaction.

**An online Bid Template** to help you formulate and post your bid in a matter of minutes.

**Price Discovery Center** to keep you updated on all the latest market information, spot, rack and NYMEX prices, and breaking industry news.

**Large pool of qualified Suppliers** ready to make offers on your business.

**Reports Database** to compile your transaction data and generate analyses on your bids/offers, competing suppliers and potential winners.

**Team of Client Services Representatives** available around the clock to answer your questions and serve you.

**Robust IT Infrastructure** to make your

transactions run smoothly at all times.

#### Seven Reasons You Should Use The Exchange For Your Term Bid Business

**Proven Success:** In the first month of operation, The Exchange conducted 300 auctions and awarded 105 million gallons of fuel from three of the nation's largest fuel buyers to 15 suppliers.

**Cutting-Edge Technology:** The Exchange built a system utilizing best-of-breed technology to handle all the "leg work" of buying fuel.

**Simplicity:** All you have to do is complete an online bid template and let The Exchange automatically upload the information onto our system. The Exchange will handle the rest.

**Detail:** You tell us your fuel requirements. From volumes and delivery locations to delivery requirements and specifications, you decide.

**Control:** You decide the time frame of your bid and The Exchange will incorporate it into your requirements.

**Flexibility:** You can use whichever pricing method you wish, including: fixed, index (OPIS rack city, OPIS Spot, Platt's Spot and NYMEX) or posted pricing.

**Market Knowledge:** The Exchange provides you with real-time pricing, market information, trends, commentaries, all on our website and all for free. (Apexchange.com)

In addition to the reasons listed above, the exchange has helped companies save time and resources by eliminating phone calls, faxes, and hundreds of invoices; all information is centralized. Purchasing fuel via The Exchange also allows access to suppliers that could potentially be located hundreds or thousands of miles away.

**United Airlines First to Harness E-Commerce for Fuel Buying.** Determined to drive down fuel buying costs, United Airlines was the first airline to tap new Internet-based technology to buy its jet fuel. United selected the American Petroleum Exchange, a neutral marketplace that had already completed over 1,700 diesel fuel and gasoline transactions, to host The Exchange's biggest deal to date, a 140 million gallon jet fuel auction in early February 2001. Fuel purchased through The Exchange flowed to over a dozen airport storage terminals, including Chicago, Los Angeles, New York and Miami, starting March 1, 2001. (Apexchange.com)

Bob Sturtz, United's Director of Petroleum Purchasing states that,

With jet fuel prices at such high levels, United felt they owed it to their stockholders and customers to capture the power of e-commerce to maximize fuel-buying efficiencies. United Airlines' goal was to significantly drive down the costs of buying, dispatching, tracking and paying for fuel. United executives believed The Exchange offered the best opportunity to achieve these goals. (Apexchange.com)

#### **D. BULK FUEL MANAGEMENT WITHIN THE FEDERAL GOVERNMENT**

Defense Energy Support Center (DESC) serves as the single point of entry for all bulk fuel bought and sold by DoD worldwide. In fiscal year 2000, DESC purchased over \$3.1 Billion worth of bulk fuel to support this mission. (Barnard) DESC coordinates seven commodity business units, which includes Bulk Fuels. In 1995, DESC reorganized from traditional, functional structures to commodity business units (CBUs) combining all functional specialties required to deliver support in that commodity.

The director of the Bulk Fuels CBU acts as principal advisor and assistant to the Director DESC in providing global support for contracting, distribution, transportation, and inventory control of bulk fuels including jet fuels, distillate fuels, residual fuels, automotive gasoline's (overseas only), specified bulk lubricating oils, aircraft engine oils, fuel additives such as fuel system icing inhibitor, and crude oil in support of the Department of Energy Strategic Petroleum Reserve Program. The director also sells excess petroleum products.

The Bulk Fuels CBU is further divided into four divisions, including Inventory and Distribution Management, Contracting, Quality Operations, and Product Technology and Standardization. (Barnard)

**1. Inventory and Distribution Management Division (DESC-BI)**

The Inventory and Distribution Management Division manages the inventory and distribution of petroleum products purchased and delivered in bulk quantities to support military and federal operations. These bulk petroleum products are primarily military specification aviation and shipboard propulsion fuels, but also include lubricating oils, additives, and motor gasoline.

The division is made up of three branches. The Requirements and Inventory Control branch (Code BIB) consolidates military and federal requirements for bulk petroleum products into purchase programs, executes these programs, and manages bulk petroleum inventories throughout the world. The Distribution Branch (Code BID) has two sub-units: the Operations Team (Code BIDO) and the Rates Team

(Code BIDR). The Operations Team sets and monitors compliance with transportation policy, works closely with the Military Traffic Management Command (MTMC) to obtain needed services, and formulates/executes the transportation budget needed to distribute bulk petroleum products. The Tanker Operations Branch (Code BIT) schedules and coordinates the ocean movements of bulk petroleum products from suppliers to oceanfront Defense Fuel Support Points (DFSPs). This effort uses a core fleet of five chartered ocean tankers, and periodic movement of bulk petroleum products via spot chartered ocean and coastal tankers. The Military Sealift Command (MSC) provides Ocean tanker transportation, and the Tanker Operations Branch maintains constant close liaison between MSC, oceanfront DFSPs, and regional managers. (desc.dla.mil)

## **2. Contracting Division (DESC-BZ)**

The Contracting Division acquires assigned bulk fuel items worldwide. The predominant items are aviation and ship fuels. The division also purchases Bulk Lube Oils, negotiates product for product exchange agreements, negotiates excess petroleum products sales, performs contract administration for all contracts and sells and purchases crude oil to support the Department of Energy's Strategic Petroleum Reserve Program. (desc.dla.mil)

## **3. Quality Operations Division (DESC-BQ)**

The Quality Operations Division provides Center Quality Assurance support to all DESC CBU Contracting, Supply, Transportation and Facility staff. This division also develops policy, programs and procedures for implementing fuel quality assurance and quality surveillance. The division is also quality subject matter

experts for quality assurance and quality surveillance within the Defense Fuel Regions/Offices, Military Sealift Command, Military Traffic Management Command, and Defense Contract Management Command personnel. Additionally, the division serves as the focal point for fuel or fuel related customer/depot complaints. (desc.dla.mil)

#### **4. Product Technology and Standardization Division (DESC-BP)**

The Product Technology and Standardization Division provides DESC overall technical support for products purchased for its customers (except natural gas). In this capacity, the division also serves as DESC representative at NATO and other industry/Government forums addressing product specification issues. (desc.dla.mil)

#### **E. SUMMARY**

When considering bulk fuels sales and purchases, the commercial marketplace and Government share similarities and differences. The most significant common ground is the need to coordinate numerous buyers and sellers. Both commercial industry and Government share the fact that the ultimate fuel destinations and the potential sources need to be efficiently matched at a fair and reasonable price.

In an effort to expand and connect the bulk fuel marketplace, commercial industry, most notably United Airlines and United Parcel Service, has wholeheartedly embraced the eBusiness concept. On the other hand, Government has not explored the use of Dynamic Pricing to date in its purchases and sales.

Dynamic Pricing is an innovative business practice that has potential to bring the worldwide marketplace together. As United Airlines and UPS have done, Government

and DESC stand to empower themselves by employing Dynamic Pricing. The potential efficiencies include increased competition, getting the best price, best value, and better allocation of resources.



THIS PAGE INTENTIONALLY LEFT BLANK

### III. COMMERCIAL AND DOD BULK FUELS ACQUISITION PROGRAMS

#### A. INTRODUCTION

This chapter examines both the commercial and Department of Defense bulk fuels acquisition programs. It concludes by discussing of the similarities and differences in the business practices of DESC and private industry.

### *BULK FUELS PROGRAMS*

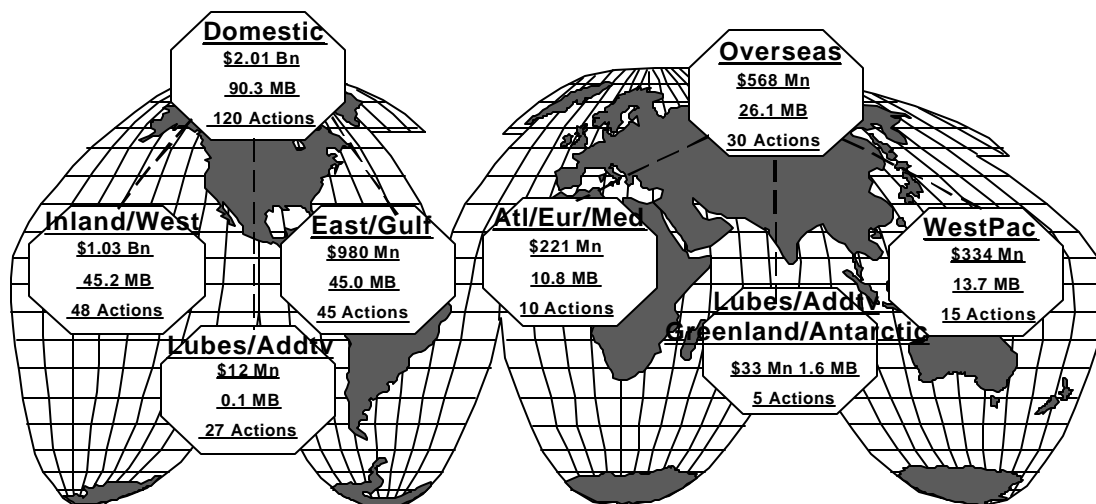


Figure 3.1. DESC Bulk Fuels (From Ref. 3).

#### B. DESC/DOD BULK FUELS PROGRAMS

As depicted in Figure 3.1 the Defense Energy Support Center (DESC) is the world's single largest procurer of fuel, and has the enormous responsibility of obtaining fuel for the Department of Defense in the most efficient and cost effective manner. Because DESC has numerous suppliers

and customers spread throughout the globe, sound business practices that maximize resources and minimize cost are mandatory. Recognizing the demand for savings and quality, DESC has streamlined services that feature the technical, contracting, and marketing expertise needed to make highly informed and successful energy management decisions. (desc.dla.mil)

DESC's Contracting business unit employs techniques that effectively procure of bulk fuel. The effort of buying and selling bulk fuel is accomplished in three phases that include demand forecasting, pre-award, and award.

### 1. Demand Forecasting

DESC acquisition professionals forecast demand by evaluating input from sources such as customers, past sales, regional data, and current contracts. Another important tool used by DESC is the Defense Fuels Automated Management System (DFAMS).

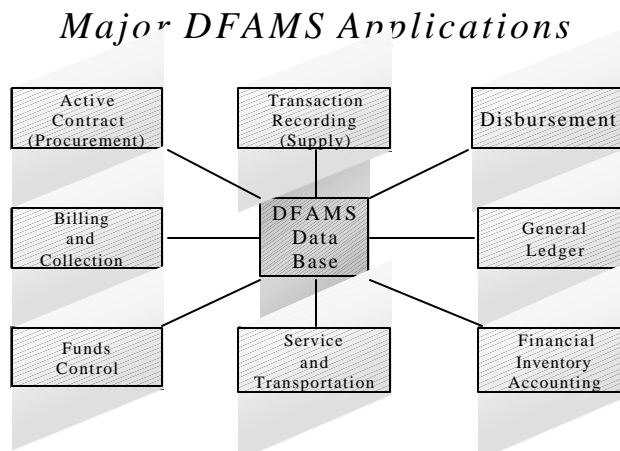


Figure 3.2. Major DFAMS Applications (From Ref. 14).

As illustrated in Figure 3.2, DFAMS is a database that has numerous applications, each of which has an effect on

demand forecasting. DFAMS provides important data to the Bid Evaluation Model (BEM) that is discussed later in this chapter while also generating sales data that is essential for the initial purchase program review.

After combining the results of exercises, mission changes and the applications in the illustration above, the next step is using the Fuels Automated System (FAS). FAS monitors transaction volume and has a tremendous impact on DESC.

Before placing a request for fuel, requirements must be validated by the Requirements Manager (RM). The RM has several factors that must be validated before deciding to issue a working purchase request. The requirements factors include:

- Peacetime consumption
- War Reserve Program
  - Draw downs
  - Build
- New tank inventory build
- Maintenance and repair
- Current contract status (Kinard)

The requirements process summarized in Figure 3.3 illustrates that DESC employs a systematic approach.

## *Requirements Process*

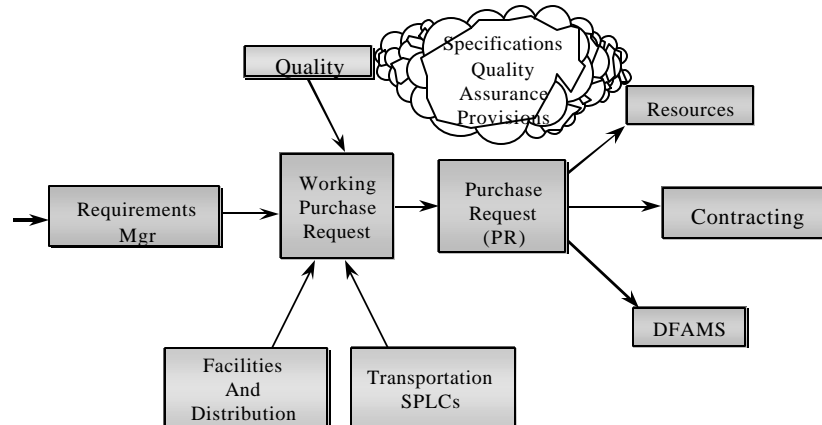


Figure 3.3. Requirements Process (From Ref. 14).

The requirements manager (RM) carries a large responsibility in the requirements process. The RM is accountable for ensuring the following tasks are completed:

- Simplified purchase request and solicitation documents
- Electronic routing/ coordination
- Export requirements directly to the BEM
- Import award information from the BEM (Kinard)

The requirements manager must successfully integrate all information available to afford cost and time-effective bulk fuel procurements. The RM ensures all purchase requests include

- Item description
- Delivery date
- Quantity
- Mode of delivery
- Delivery restrictions

- Quality requirements/specifications
- Seasonal restrictions
- Additives (Kinard)

All the above items must be incorporated into the purchase request to ensure timely, accurate, and complete delivery of the requested fuel. Miscalculations, misinterpretations, and unclear requirements equate to an unsuccessful procurement, which ultimately leads to a dissatisfied customer, wasted time, effort, and money.

DESC employs Requirements Data Call (RDC), which is an internet-based application designed to electronically process fuel requirements for DESC-solicited items from local activities to the DESC Inventory Manager. (Kinard) Using information technology in this manner assures efficiency by decreasing the chance of mistakes and keeps information flowing continuously.

## **2. Preaward**

The preaward process is a key element to successfully acquiring bulk fuel for DoD. In preaward the following occurs:

- Receiving and verifying the purchase requirement
- Planning the acquisition
- Soliciting offers
- Reviewing offers
- Negotiating and finalizing offers (Kinard)

The preaward phase serves three important purposes including (1) providing the basis for legally sufficient contracts, (2) conveying accurate requirements and associated conditions, and (3) incorporating all current regulatory and legislative provisions (Kinard).

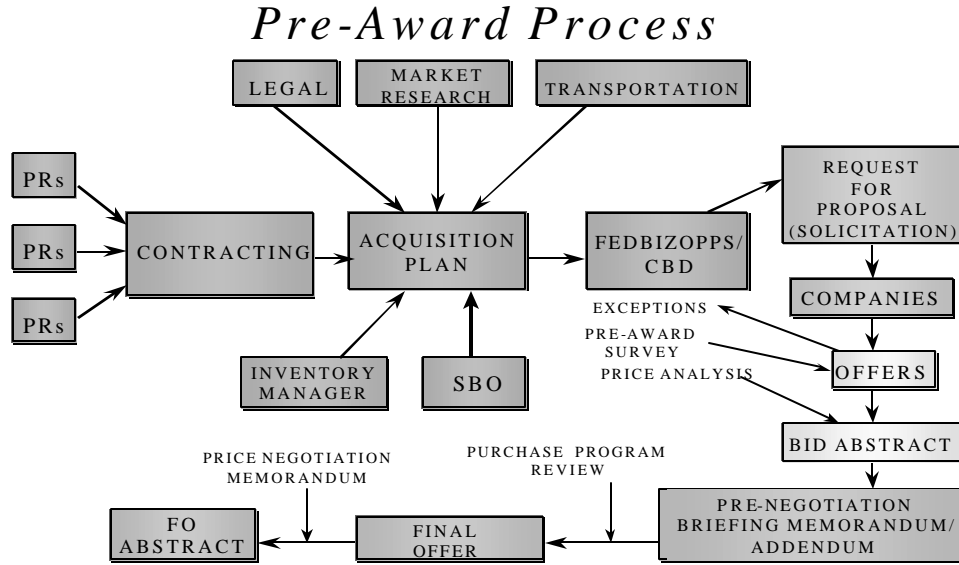


Figure 3.4. Pre-award Process (From Ref. 14).

Satisfying these purposes offers the buying organization legal protection, thorough and precise communication, and strict compliance with local and Governmental directives.

Figure 3.4 depicts the pre-award process and illustrates the essential elements involved with the progression of a bulk fuel requirement. The bulk fuels procurement process would be incomplete and grossly inefficient without following the steps described in Figure 3.4.

Upon receiving the purchase request (PR), the contracting officer verifies the fuel requirements, specifications, cost/price, modes of transportation, and the previous year's program. Simultaneously, the contracting officer must constantly consider the inventory manager, and consider quality.

Before moving forward and posting the requirement in the Commerce Business Daily (CBD), an acquisition plan must be devised that includes:

- Description of requirements
- Purchase history
  - Extent of competition
  - Problems
  - Price range
- Socio-economic programs
- Methods of acquisition
  - Negotiated
  - Sealed bid
  - Full and open competition
  - Economic Price Adjustment
  - Market survey/research
  - Milestones (Kinard)

The acquisition plan is an invaluable tool and assists in meeting the organization's and the end-user's needs.

While each of the items listed in the acquisition plan is important, DESC concentrates on socio-economic programs. Socio-Economic Procurement Programs (SEPP) are important for the organization and economy as a whole and SEPP's significance is evident in the bulk fuels procurement process. As illustrated in Figure 3.4, the Small Business Office (SBO) ensures SEPPs are included in the acquisition plan. The BEM takes SEPPs into account before an offer is made available for an unrestricted run.



### 3. Effects of the BEM on the Award Process

After determining the requirement, but prior to awarding a contract for bulk fuels, DESC must determine a fair and reasonable price while efficiently matching multiple sources with multiple requiring destinations/locations and multiple transportation alternatives.

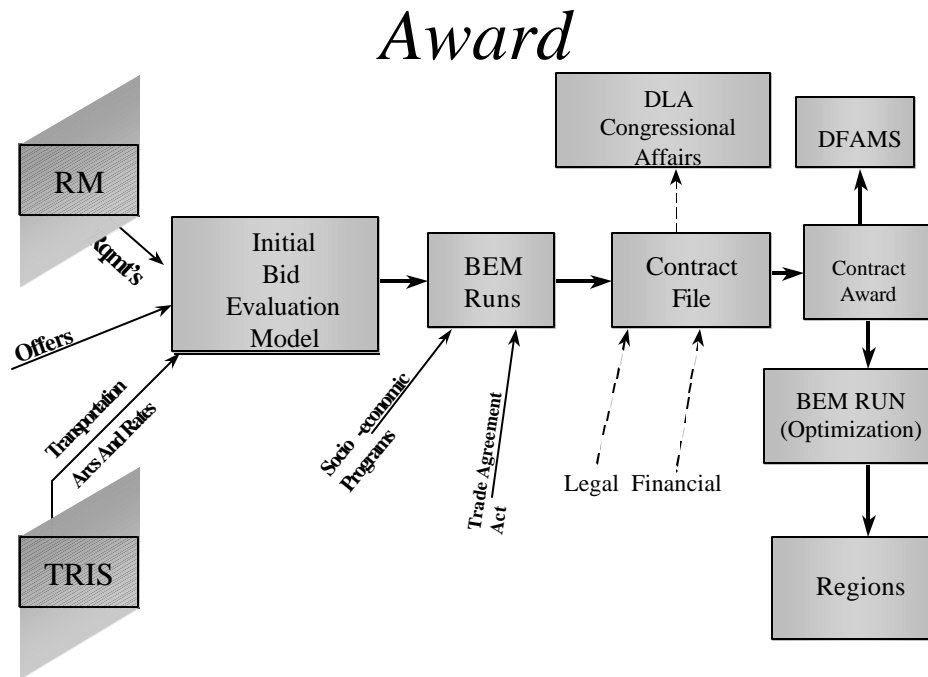


Figure 3.5. Award Process, (From Ref. 14).

DESC recognized a problem in determining the "lowest overall laid-in cost" for large purchase programs that contain:

- Multiple offers/sources for each product
- Multiple requiring locations/destinations
- Both FOB destination and FOB origin offers
- Multiple distribution cost components and options

Additionally, distribution costs include:

- Operating cost for ocean tankers, barges, tank trucks, pipelines
- Excess thru-put charges and environmental fees
- Terminalling costs for tariff agreements
- Additive injection (Kinard)

The solution to combining the numerous variables is a mixed integer linear program called the Bid Evaluation Model (BEM). Figure 3.5 illustrates how DESC employs the BEM. Ragsdale states,

**mathematical programming (MP)** is a field of management science that finds the optimal, or most efficient, way of using limited resources to achieve the objectives of an individual or a business. For this reason, MP is often referred to **optimization**. (Ragsdale, 2001, p. 16)

Optimization clearly describes the BEM, as the BEM's ultimate goal is to balance numerous cost variables to minimize the total cost of delivered fuel. Unlike other DoD supply centers, DESC considers distribution costs up front rather than as part of the overhead/surcharge that accrues after the product is purchased. When using the BEM, and in accordance with the theories of linear programming, the decision variables are the multiple offers/sources of Refined bulk fuel with are composed of both FOB destination and FOB origin offers. The constraints are the required fuel volumes at the multiple requiring locations/destinations, operating costs for various modes of transportation, distances between multiple sources and destinations, environmental fees, and additives for the different types of fuel. Figure 3.6 illustrates

numerous methods of transporting bulk fuel to the end user. The methods include oil tankers, pipelines, and trucks.

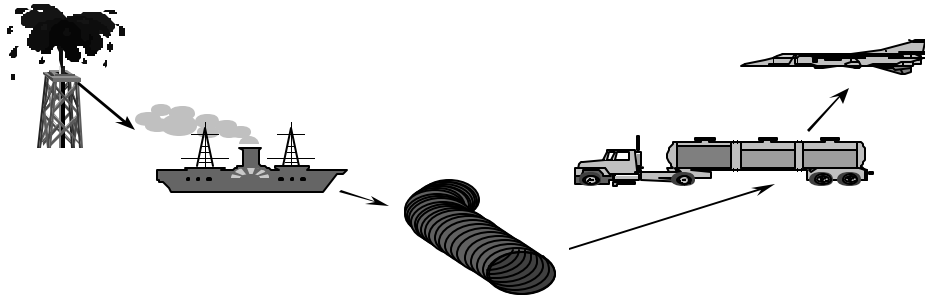


Figure 3.6. Methods of Transporting Bulk Fuel to End Users (From Ref. 14).

Ragsdale states,

In routing and logistics the amount of merchandise available at the warehouse and the amount needed at each store tends to fluctuate, as does the cost of shipping or delivering merchandise from the warehouses to their locations. Large amounts of money can be saved by determining the least costly method of transferring merchandise from the warehouse to the stores (Ragsdale, 2001, p. 17)

Ragsdale observes the importance of costs savings, and it is for this precise reason DESC uses the BEM. All of the variables affecting cost (i.e. distance and mode of shipment) from the source to the ultimate destination are considered in the BEM. As an example, the region shown in Figure 3.7 is DESC's East/Gulf Coast procurement region.

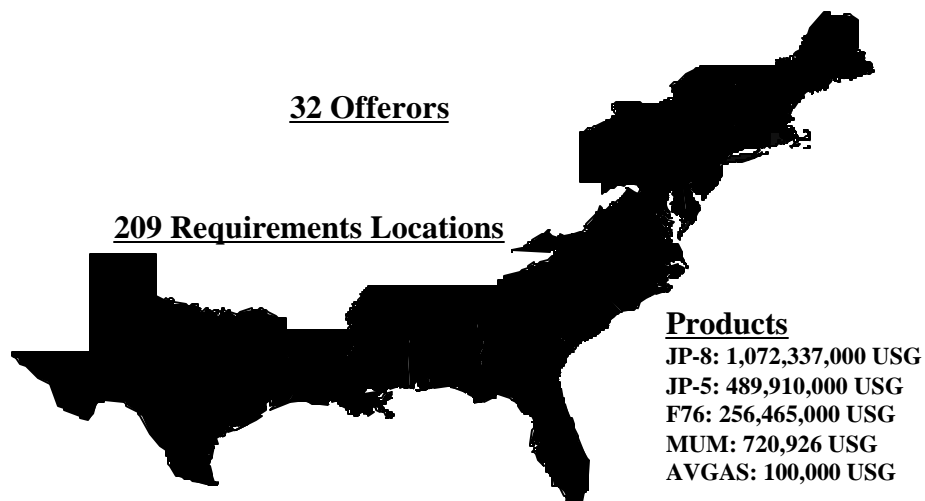


Figure 3.7. DESC East/Gulf Coast Region (From Ref. 14).

DESC manages its purchase program by dividing the globe into four regions labeled Inland/West, East/Gulf Coast, Atlantic/European/Mediterranean, and Western Pacific. Of the four regions, 80% of the volume is bought in the United States. (Kinard) While DESC recognizes that aggregated requirements establish the substantial quantities that attract the world's largest oil companies and provide for the associated price breaks commensurate with volume purchasing, DESC splits the world into these four "procurement programs" for the following reasons:

- DESC's volumes are so large that no single refinery, or geographic group of Refineries, can fulfill the entire requirements.
- Creating separate purchase programs and staggering their procurement timing assures DESC will always have some quantity of product on

contract in case a problem arises with any one-purchase program.

- Splitting the total worldwide requirement into these smaller programs is necessary to create linear programming problems that are not so large they cannot be solved by current state of the art computers. (Barnard)

In the 1996 example shown in Figure 3.7, there were 32 offerors, 209 requiring locations, and five different products. When considering the various modes of transportation summarized in Figure 3.6, the multiple offerors and requiring locations of Figure 3.7, reasons for the BEM are clearer. The BEM is used to obtain the lowest overall program cost. Although an individual offeror may have the lowest laid-in cost to a particular location, the offeror may not actually be awarded the quantity if that particular quantity is needed to meet another offeror's minimums that will result in lower total program costs. The BEM considers each of these variables and makes literally millions of calculations to determine the best combination of awards.

The contract evaluation depicted in Figure 3.8 illustrates the multiple paths of how one company's product can be delivered to just one requiring location via multiple transportation modes. There are several arcs to get to each node or hub. In the overall contract evaluation, every offeror's product is evaluated for every requiring location via all combinations of delivery modes. The linear program (BEM) then sums all of these alternative combinations to determine the lowest total cost for the entire purchase program. It is this process that generates the millions of calculations the BEM processes during each

evaluation. The BEM helps DESC contracting officers, like any prudent businessperson, establish the best business deal for their customers.

Although not shown in Figure 3.8, the BEM includes both transportation costs and distribution costs, such as throughput minimums and maximums of the various locations and modes, costs of additives, and excess throughput charges.

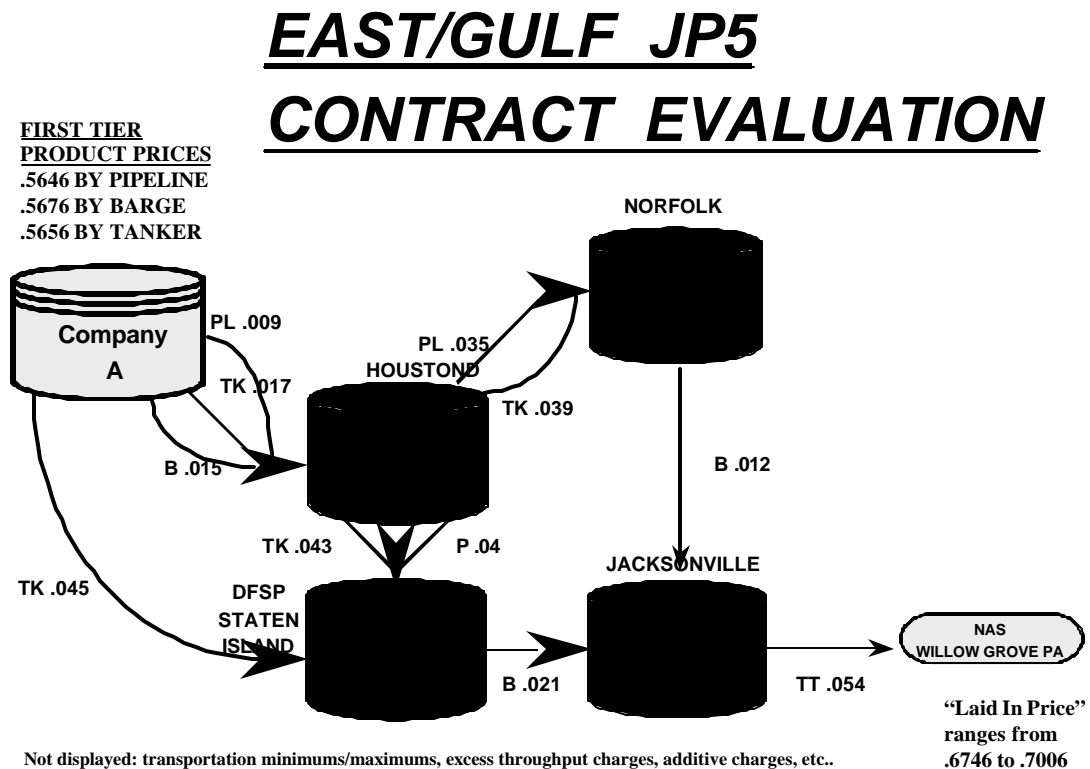


Figure 3.8. East/Gulf Coast JP5 Evaluation (After Ref. 14).

Initial observations indicate that a cost determination could be made for one price at one location, however, the lowest overall program cost must always be

considered, as in the BEM. The BEM determines the successful supplier for each destination and how the fuel should be delivered to the destination through the network. The aggregation of the solutions for all destinations is the minimum cost solution for the entire purchase program.

#### **C. COMMERCIAL AIRLINE PRACTICES FOR BUYING BULK FUEL**

The commercial airline industry has bulk fuel requirements that are similar to those of DoD. However, the commercial airline industry does not have requirements that span the globe. Additionally, the vast majority of the commercial airline requirements exist in locations (commercial airports) that are serviced by dedicated commercial pipelines, as opposed to many of DoD's requirements that exist at remote installations without a commercial distribution infrastructure. As a result, the commercial airlines have meaningful competition for fuel deliveries directly to the airports, without arranging for independent distribution of the fuel. Therefore, the commercial airlines do not use a linear programming model that accounts for the numerous variables that comprise a DoD bulk fuel buy. The commercial airlines industry is able to identify a requirement for a particular location, solicit offers, and award based on lowest cost bid for that specific requirement on an FOB destination basis.

#### **D. CONCLUSION**

While the Defense Energy Supply Center and the commercial airlines industry share common ground, there is significant difference in their buying practices and goals.

The similarities are that both seek to maximize efficiency and minimize cost by optimizing the numerous sources and requirements. However, the difference between

the two is in the size of the bulk fuel purchases and the means of getting fuel from refineries to requiring locations. DESC is seeks the lowest overall cost for the aggregated program versus the lowest cost for one particular buy.



THIS PAGE INTENTIONALLY LEFT BLANK

## **IV. ANALYSIS**

### **A. INTRODUCTION**

Although Dynamic Pricing in the form of Reverse and Forward Auctions is becoming more prevalent in the DoD acquisition community, the complexities of DoD's fuel buying processes introduce some interesting complications to the Dynamic Pricing model. This chapter examines some of the issues involved with incorporating Dynamic Pricing into DESC's BEM evaluation process.

### **B. OPINIONS AND CONCERNS OF THE CURRENT PROCESS PARTICIPANTS**

To establish a basis for implementing Dynamic Pricing in DESC's bulk fuel acquisitions, the researcher surveyed the current process participants. One survey was distributed to the DESC workforce while the other was sent to DESC suppliers. The full survey responses are contained in Appendices A and B.

#### **1. Socioeconomic Concerns**

In the surveys, both the DESC workforce and a portion of the DESC supplier base expressed concern over how the reverse auction process would affect DESC's current application of the Government's socioeconomic programs. Specific concerns included:

- How is this going to affect our small disadvantaged business set-aside? (Appendix A)
- We are a Small Disadvantaged Business and do not feel this approach would meet the requirements of the program. That is, we should not have to compete in an open auction against all of the other Refiners. (Appendix A)
- The potential to pay higher prices under the various socio-economic premium programs.

Currently the small businesses offering under a premium program must still offer their best price at Final Proposal Revision or risk being priced higher than the maximum premium price thereby being eliminated from consideration. Under reverse auctioning the offerors under these programs would be able to maximize the premium amount they would receive because they would be able to see the apparent low price. (Appendix B)

DESC adheres to a robust Socioeconomic Procurement Program (SEPP). The BEM is run in a manner that takes into account all areas of socioeconomic concerns. SEPP Classifications are Small Business, Small Disadvantaged Business, Women-owned Small Business, Section 8(a) applicants, and HUBZone Small Business Concern.

To accomplish the goals of the SEPP, under DESC's current procedures, they conduct an initial BEM run to establish the "fair market price" of the products being purchased. This satisfies the requirements of FAR 19.807 - Estimating Fair Market Price. This BEM run is composed of all of the product offers on an unrestricted basis. Therefore the solution from this BEM run is the equivalent of a fair market price in an unconstrained marketplace. After the fair market price is obtained, 8(a)s are allowed to match that price. If the 8(a)s are able to match the fair market price, the 8(a)s contract awards (quantities and prices) are then "locked in" to the BEM in the form of problem constraints. Subsequent BEM runs then allocate/award product in succession to the hierarchy of socioeconomic groups until a final BEM run determines the awards for the unrestricted portion of the acquisition program.

This researcher believes that Dynamic Pricing's Reverse Auction can be used with the BEM, but must be incorporated with the initial base run for SEPPs. Using Dynamic Pricing after the initial base run creates the potential for SEPPs to earn a higher price premium, which was presented in the DESC Workforce survey, because the social preference companies would then be able to price their product after having seen the apparent winning prices. By incorporating the Reverse Auction into the initial base run of the BEM evaluation process, all offerors would be on the same "playing field" as they were in the historical process, but would have the market insight afforded by the Reverse Auction process.

Under the Reverse Auction process envisioned by this researcher, it would not be apparent to the offerors who had won what quantities and at what prices at the auction's conclusion. The offerors would have only been afforded the opportunity to revise their prices after having seen the first/previous auction round's prices and associated transportation/distribution costs. This process is presented in more detail later in this chapter.

Of interest, this concern would only be applicable to DESC's domestic purchase programs as the U.S. Government's socioeconomic programs are largely inapplicable to contracts performed overseas. Therefore, DESC could incorporate Reverse Auctions into their overseas purchase programs, which represent approximately 20% of their bulk fuel buys, at a value of over \$800M/year, without this concern.

## **2. Lowest Total Program Cost vs. Lowest Single Source of Fuel Cost**

As presented in Chapter III, DESC's acquisition philosophy is based on achieving the lowest cost for the entire purchase program, not just the lowest cost for any individual requirement within the purchase program. This is the rationale for DESC's BEM evaluation tool, which solves what is known in linear programming as a "total cost minimization problem."

Concerning this acquisition approach, both the DESC workforce and a portion of the DESC supplier base expressed concern over how the reverse auction process would affect DESC's current "Lowest Total Program Cost" philosophy. Specific concerns included:

- Reverse auction for one location with one price is simple. How do you handle multiple locations, multiple prices, and multiple pricing intervals? (Appendix A)
- I'm not sure how DESC can make their Bid Evaluation Model and the Reverse Auction concepts work together. (Appendix A)

The difficulty is in applying the complex algorithms of the Bid Evaluation Model to the reverse auctioning process. Because the Bulk programs purchase large quantities of fuel on an FOB Origin basis for subsequent distribution to hundreds of end-use activities, the evaluation process must include the potential to distribute the offered product to hundreds of locations by up to five different methods of delivery. These offers compete directly against FOB destination offers to the same locations. The complexity of this evaluation process requires a linear model that often runs for more than twenty-four hours to reach a final solution. (Appendix B)

The current Bulk procurement process derives the OVERALL lowest laid down price for ALL products to be procured in the solicitation. The reverse auction process would require separating these products into individual auctions. This would result in inefficiencies in the procurement and the loss of the ability to "trade off" one product against another in order to find the mix of awards that result in the lowest price to the Government. (Appendix B)

The goal of Dynamic Pricing is to create a competitive environment that yields the lowest cost for the buyer. A typical Dynamic Auction is illustrated in Figure 4.1.

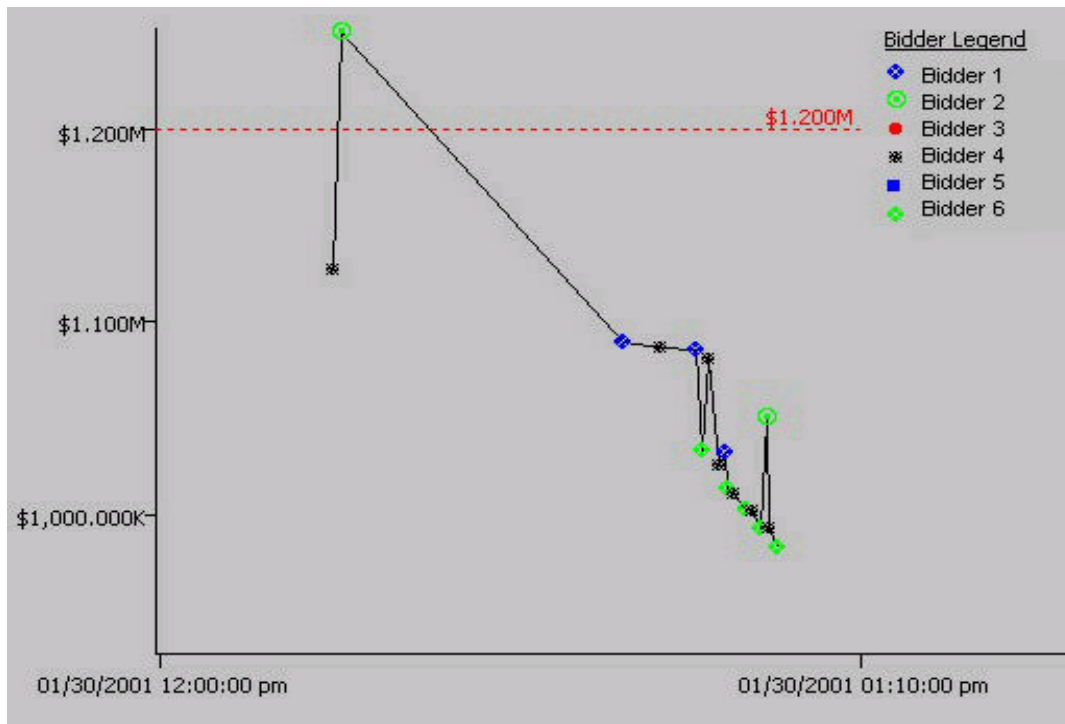


Figure 4.1. Typical Dynamic Auction (From Ref. 9).

In Figure 4.1 the price of \$1.2M is shown as the absolute highest price. After approximately one hour and ten minutes the competitive forces of the marketplace have forced the price down to \$990,000 from an initial bid of \$1.120M and the auction is closed at that final price.

The researcher believes that the "classic" Dynamic Auction shown in Figure 4.1 is not suited for DESC. Under the classic approach, the lowest price seen by the auction participants on the interactive screen directly correlates to the price that must be beat to win the contract. However, the individual offered prices in DESC's case are almost meaningless without seeing their associated conditions: minimum required volume to be awarded, maximum volume available, tiered pricing for associated volumes, associated distribution costs, etc. These associated conditions are all of the variables the BEM considers when determining the lowest total program cost. For this reason, the offerors should see all of the conditions associated with all of the offered prices to make educated price revisions.

DESC's BEM currently produces several reports that contain all of the costs used to evaluate each individual offer. Instead of a classic reverse auction where offerors see their competitor's current bids, a DESC reverse auction should provide the offerors with the BEM evaluation details. In this manner, an offeror would be able to see how much volume, if any, they are currently winning and how their offer stacks up against the competition. Absent this information, raw prices are of little value to the competitors.

Figures 4.2, 4.3, and 4.4 are samples of portions of the current reports produced by the BEM. All of this information is currently made available to all offerors in an automated format via DESC's web site, after contracts are awarded. Incorporating this data into Reverse Auctions would require adapting this process to make this information available to the offerors during the Reverse Auction process. To keep offerors confidential as required by the FAR, the BEM output would need to be sanitized to disguise the offerors names. After the names are disguised with generic names, the results could then be issued to each offeror.

MINIMUM COST SOLUTION BID EVALUATION SHEET										
Buy Name :00IWIV Description :Added By Library Cleanup Last Saved :11/19/01										
Products :JP8 - JP5 - JP4 - F76 -										
Purchase Program Numbers:22B - 22D - 25B -										
FOR PRODUCT F76 IN TIME PERIOD 0										
ITEM NO	DESTINATION	QUANTITY REQUIRED	SETASIDE QUANTITY	8A QUANTITY	PERCENTAGE OF DEMAND ALLOWED BY MODE					
1002	DFSP Pt Loma CA 889000296	99,795,000	79,836,000		0	100.00%	100.00%	0.00%	0.00%	0.00%
COMPANY	TIME PERIOD OFFERED	QUANTITY BID	BID PRICE	TOTAL ADD	TOTAL EVAL	LAI	DOW	PRICE		
SHIPPING POINT	TERMINAL	MODE	TRANS RATE	OTHER COST						
ARCO		172,545,000	0.774830	0.000000	0.000000					
0 Ferndale WA	844149000	K	0.053843					0.828673		
PARAMOUNT		45,360,000	0.803673	0.000000	0.000000					
0 Carson (GATX)	863245000A	B	0.025000					0.828673		
PARAMOUNT		49,350,000	0.839833	0.000000	0.000000					
0 Carson (GATX)	863245000A	K	0.019481					0.859314		
ARCO		122,976,000	0.824830	0.000000	0.000000					
0 Ferndale WA	844149000	B	0.020238					0.845068		
DFSP Puget Sound	845459290	K	0.054733					0.896801		
US OIL		17,300,000	0.835000	0.000000	0.000000					
0 Tacoma WA	846200000C	B	0.010476					0.845476		
DFSP Puget Sound	845459290	K	0.054733					0.900209		

Figure 4.2. BEM Bid Evaluation Sheet (From Ref. 7).



BID SUMMARY OF AWARD INFORMATION							TIME 11:24:48
Buy Name :00IWIV Description :Added By Library Cleanup Last Saved :11/19/01							DATE 12/11/01
Products :JP8 - JP5 - JP4 - F76 -							PAGE 1
Purchase Program Numbers:22B - 22D - 25B -							
FOR PRODUCT F76N TIME PERIOD 0							
COMPANY	SHIPPING POINT NAME		VOL OFFERED	VOL AWARDED	VOL REMAINING	CONTRACT VALUE	LAID DOWN COST
ARCO	Ferndale WA 84414900		295,521,000	76,150,000	219,371,000		
	COMPANY TOTAL :		295,521,000	76,150,000	219,371,000	62,810,804.50	69,348,009.06
PARAMOU	Carson (GATX 88324500		94,710,000	45,360,000	49,350,000		
	COMPANY TOTAL :		94,710,000	45,360,000	49,350,000	36,454,807.28	37,588,807.28
TESORO HI	Aiea HI 89053100		39,000,000	0	39,000,000		
	Barbers Poin 89053500		39,000,000	39,000,000	0		
	COMPANY TOTAL :		78,000,000	39,000,000	39,000,000	32,460,870.00	32,460,870.00
US OIL	Tacoma WA 84620000		17,300,000	12,035,000	5,265,000		
	COMPANY TOTAL :		17,300,000	12,035,000	5,265,000	9,898,510.69	10,024,589.36
TOTAL FOR PRODUCT F76N TIME PERIOD 0							
			563,531,000	172,545,000	312,986,000	141,624,792.47	149,422,075.70
TOTAL VOLUME SOLICITED :			172,545,000				
TOTAL SET-ASIDE QUANTITY :			91,871,000				
TOTAL BA QUANTITY :			0				

Figure 4.3. BEM Summary of Award Information (From Ref. 7).

RATES REPORT							DATE 12/11/
Buy Name :00IWIV Description :Added By Library Cleanup Last Saved :11/19/01							TIME 11:41:
Products :JP8 - JP5 - JP4 - F76 -							Page 1
Purchase Program Numbers:22B - 22D - 25B -							
Rates For One Leg Routes Going To Destination:				DFSP Pt Loma	889000296		
Shipping Point		Product	Mode	Rate			
Carson (GATX Terminal)	CA 883245000A	F76	B	0.025000			
Ferndale	WA 844149000	F76	K	0.053843			
DFSP Puget Sound	845459290	F76	K	0.054733			
Carson (GATX Terminal)	CA 883245000A	F76	K	0.019481			

Figure 4.4. BEM Rate Report (From Ref. 7).

Providing this information through a classic Reverse Auction would give offerors the opportunity to make sound decisions and adjustments in all areas affecting their offered fuel price while preserving the integrity of DESC's BEM evaluation and award process. Adopting this process would also allow DESC to be in total control, both physically and financially, of the Reverse Auction process, thus avoiding the effort and cost of a middleman "enabler" typically used in the classic Reverse Auction process.

### **3. Higher Prices?**

All of the literature and publicity on the Reverse Auction process touts lower prices as one of the main benefits of the concept. Interestingly, both the DESC workforce and a portion of the DESC supplier base expressed a different opinion on the potential price outcome. Specific comments included:

I'm not sure if you have thought of this aspect, but the reverse auction will probably allow us to RAISE our prices in some instances. Over the years we have often bid very aggressively in order to win the contract only to find out we have left money on the table. That is, our price was lower than it needed to be. The reverse auction visibility will allow us to adjust our prices upward after seeing what the award pattern is looking like. (Appendix A)

The potential to pay higher prices because offerors can see the apparent successful prices and can avoid under bidding and leaving money on the table. (Appendix B)

Will we have full visibility of current transportation rates and other costs that are considered with our offer? If so, this would be a great improvement over the current blind-bidding. (Appendix A)

The difficulty in establishing a benchmark to determine if the auctioning process produces cost savings and for increased sales prices relative to traditional solicitation procedures. (Appendix B)

At first glance, the idea that the Reverse Auction actually results in higher prices could be easily dismissed as a misunderstanding of the process. However, given that both the buyer and sellers in the DESC relationship raised

this possibility, it appears real. In fact, this outcome is most likely to occur when there are large differences between the prices sellers are willing to offer, and there are sellers that are anxious to win the contract in question. It is less likely if prices are similar across suppliers and suppliers are not as anxious to win the contract if winning requires a low profit margin.

This phenomenon would be similar to the functioning of the commercial residential real estate market. In that business environment, if a buyer is purchasing a house in an area that they perceive has a very active and competitive real estate market, they may very well make a "full priced" or higher priced offer to make sure they get the house of their choice. This could result in what is commonly called "buyer's remorse." However, if they engage the services of a local real estate agent and thus obtain visibility into the recent sales prices for similar homes, they may find that they can make a lower offer and still "win" the contract to buy the house. In this case, they would be satisfied that they had purchased their house at a competitive market price.

Following this analogy, the Reverse Auction can be seen as a similar form of the market visibility provided by that real estate agent. With this knowledge of the current marketplace, firms may not have to be as aggressive in their pricing.

The question then becomes, is this potential for higher prices bad? In short run it represents a higher cost for DoD. However, in the long run avoiding "seller's remorse" may actually create a better relationship between

DESC and their suppliers. This is all based on the concept of reaching an equilibrium price in the market.

Following this logic, the fact that the reverse auction process allows the offerors to make more educated or enlightened offers, should provide a good cure for the "seller's remorse" possible in the current DESC acquisition process. This would simply mean that the DESC's contracts have found the marketplace's true equilibrium price without any accompanying supplier discomforts.

#### **4. Time Concerns**

The Reverse Auction process has been advertised as a significant time saver in the Government acquisition process. However, recent research at the Naval Postgraduate School has found that several DoD suppliers believe the process actually takes more of their time, vice less. (Fabby) In this research, the DESC workforce and a portion of the DESC supplier base surveys expressed similar concerns. Specific comments included:

Please make sure it does not increase the already long time from offer to award. (Appendix A)

We are so time pressed now to get the awards made and often are waiting on BEM runs. I don't know where there is any time left to run the reverse auction. (Appendix A)

...we have to make several BEM runs to accommodate each of the social programs. Not sure how or where the reverse auction can fit in. (Appendix A)

As with most Government procurements, time is always of the essence. The concern for time actually has two elements, the actual time required to conduct the auction

and the time required to perform the analysis necessary for formulating a proposal price.

Regarding the time required to conduct the auction, the current literature typically presents the Reverse Auction as a time saver. This opinion assumes that revised prices are received and subsequently analyzed in a real time environment. In the single item, single location price used in a classic Reverse Auction, this holds true from the Government's perspective. However, this classic case ignores the effort required for offerors to make multiple, iterative pricing decisions in a time compressed environment. As documented in LT Fabby's research and echoed in this research, Reverse Auctions may actually increase the amount of time an offeror has to spend with every procurement.

Incorporating Reverse Auctions into DESC's acquisitions would require their suppliers to now make multiple pricing decisions as the auction takes place. Given the dynamics of all of the factors the BEM considers in determining the program's lowest total cost, this is no small task for the offerors. As such, multiple bidding rounds, after each successive BEM run, are probably unrealistic. DESC may be limited to just one or two bidding round.

Likewise, every time DESC receives revised prices, the only way for DESC to evaluate revised prices is to conduct another BEM run. One BEM run can take several hours or several days to derive a solution. Recognizing this limitation, DESC is probably limited to two bidding rounds in their domestic purchase programs using today's existing

BEM technology and processes. However, DESC's overseas purchase programs could conceivably run multiple bidding rounds in closer to a real time interactive environment.

Because Dynamic Pricing is conducted in a 'real time' environment, and the length of a single BEM run can vary, using Dynamic Pricing and the BEM is not practicable, but is possible.

## **5. Product Sales**

In addition to the major areas addressed above, the following issue was identified in the surveys:

- Sale of fuel, forward auction is doable. They are usually based on FOB origin only offers and no social programs. (Appendix B)
- Potential increase in efficiencies and interest in our rare sales of refined product. (Appendix B)
- The potential to maximize price for product sales. (Appendix B)

In addition to DESC's role in purchasing bulk fuel, they periodically sell fuel that either no longer meets the required product specification or is located in an area where there is no longer a requirement and it is not feasible to move the product to another location for consumption. In these sales, the product is typically sold on an FOB origin basis, so there are no transportation or distribution costs to be factored into respective price offers. As such, the BEM does not play a role in awarding these sales contracts. Therefore, the Forward Auction concept would appear to be well suited for these programs.

## **C. SUMMARY**

This chapter presents the opinions and concerns of the current participants in the Government's bulk fuels

acquisition process. The individual issues were presented and analyzed to determine if and how DESC could incorporate Dynamic Pricing into their processes. Attention focused on socio-economic concerns, and comparing between the lowest total program cost and the lowest single source of fuel cost. Chapter V will present the final conclusions and recommendations.

## **V. CONCLUSIONS AND RECOMMENDATIONS**

### **A. SUMMARY AND REVIEW OF RESEARCH QUESTIONS**

#### **1. Primary Research Question**

- **Is the Dynamic Pricing model a viable option for the purchase of bulk fuel in the Department of Defense?**

Yes, Dynamic Pricing is a viable option. However, as analyzed in Chapter IV, using of Dynamic Pricing within DESC has complexities that do not exist with commercial airlines or with the simpler Reverse Auction acquisitions conducted by DoD to-date. The intricacy of Socio-economic concerns is captured in the BEM. The numerous BEM runs required for domestic fuel programs complicate the Dynamic Pricing model. Therefore, the "classic" Dynamic Pricing models are not practicable. A modified version of the Dynamic Pricing model displaying all costing elements would be feasible for DESC.

Because Socio-economic issues are not a concern with overseas programs, several BEM runs are not necessary; therefore, the current Dynamic Pricing model is more of a viable option for DESC's overseas programs.

DoD could also use forward auctions to sell fuel on an FOB origin basis that no longer meets Military Specifications, or is no longer required in a particular area but movement is not practical.

#### **2. Secondary Research Questions**

- **What is the background and history of Dynamic Pricing in Government procurement?**

Several Reverse Auctions using Dynamic Pricing have been conducted for items ranging from mobile medical



services to shipboard berthing. Savings of up to 28% have been realized when compared to Independent Government Cost Estimates.

- **How does DoD currently buy and sell bulk fuel?**

To buy fuel DoD issues an RFP, receives offers, and uses the BEM to determine the overall laid-in cost for each of the four designated regions around the world.

- **What is the background and history of Dynamic Pricing in the commercial bulk fuels market?**

United Airlines conducted a Reverse Auction on February 8, 2001 for 140,350,000 gallons of Jet A fuel. The American Petroleum Exchange (APEX) served as the enabler. United Parcel Service (UPS) has also used APEX to conduct online auctions.

- **What issues support or limit purchasing bulk fuel with Dynamic Pricing?**

**Issues Supporting:**

- Driving prices down with 'real-time' online competition
- Increased visibility of prices
- No Socioeconomic concerns overseas

**Issues Limiting:**

- Long BEM runs and the potential for more time required to conduct the auction
- Domestic Socio-economic concerns
- Dynamic Pricing only shows the lowest price. DESC considers several cost factors and conditions.

**B. CONCLUSIONS**

As discussed in Chapter I, this thesis evaluates using Dynamic Pricing when purchasing bulk fuels for the DoD. Background research was conducted to compare commercial

and Government bulk fuel acquisition programs. Both programs share the need to efficiently match sources with destinations, however, the Government program is more complex. The complexity of the Government program is captured in the Bid Evaluation Model linear program that solves for the minimum total overall program cost. Commercial acquisition programs are designed to seek the lowest cost for a single source of fuel.

The BEM and its numerous iterations are the biggest factors inhibiting use of Dynamic Pricing. However, the purpose of the BEM is to solve for the lowest overall laid-in cost; Therefore, it is possible that the savings incurred from using the BEM are similar to the cost savings resulting from using Dynamic Pricing.

Analysis in Chapter IV revealed the concerns and fears of the DESC workforce and its suppliers. Incorporating Dynamic Pricing into DESC's BEM process is complex and must formulate a solution comprised of many variables. Therefore, the commercial airlines Dynamic Pricing application involving single buyers and sellers is not comparable.

Thoroughly examining the Dynamic Pricing model and DESC's BEM shows that the two concepts are not easily combined, and in most cases (domestic programs) Dynamic Pricing not feasible. Integrating Dynamic Pricing in overseas programs is possible, however.

### **C. RECOMMENDATIONS**

Based on the conclusions above, this thesis offers the following recommendations:

- **DESC and Suppliers receive training on reverse auctions**

The enabler is capable of training both parties. The enabler could also clarify how confidentiality is established and maintained throughout the bidding process. NAVSUP has awarded contracts to two enablers, eBreviate and Procuri.com who will provide training as needed. (NAVICP News release)

Training would ease fears and concerns to first-time participants and make potential Reverse Auctions run more efficiently. Training will also create dialog and identify possible pitfalls and obstacles.

- **Perform a trial Reverse Auction**

DESC would gain valuable knowledge by performing a trial Reverse Auction for research purposes only. The time required to run the BEM is a major concern. DESC should use an enabler and display the minimum cost sheet elements on the Dynamic Auction and (1) determine if displaying the elements is feasible and (2) determine how long the BEM run combined with Dynamic Pricing would take. The time and funding for this effort would allow DESC officials to make an informed decision supported with data when considering Dynamic Pricing.

- **Maintain current BEM practices**

The BEM is efficient and can be used with a custom-made Dynamic Pricing model tailored to display BEM conditions affecting lowest total program cost.

- **Employ Dynamic Pricing with Overseas Programs**

Socio-economic issues do not affect overseas programs: Therefore, numerous BEM runs are not required. Lessons learned from the overseas programs should be documented and

used as a foundation for expanding the Dynamic Pricing concept domestically.

#### **D. SUGGESTED FURTHER STUDIES**

This thesis has addressed several important issues that could potentially save the Government money. However, further research remains in the following areas:

- **How many pricing rounds are feasible with the BEM and Dynamic Pricing?**

The BEM is known for its time-consuming runs, but more runs could be required to consider socio-economic concerns if using Dynamic Pricing.

- **Buy-In Prevention/Implications with Reverse Auctions**

The potential exists for contractors to underbid to obtain the contract. Documentation needs to be maintained and tracked for non-performance and defaults.

- **Applications of Reverse Auctions in DoD**

Additional research should be conducted to determine the items that are most suited to Reverse Auctions.

- **Effects of Reverse Auctions on Socioeconomic concerns**

Research should be devoted to the effects of Reverse Auctions on socio-economic concerns. A study should be conducted to determine the potential negative and positive outcomes.

- **Joint Operations Analysis & Acquisition Effort**

Additional research is warranted combining the theories of operations analysis and acquisition to develop an interactive 'real-time' BEM capable of supporting a 'real-time' Reverse Auction.

THIS PAGE INTENTIONALLY LEFT BLANK

## APPENDIX A. DESC SUPPLIER SURVEY RESPONSES

2) Yes, but with some concern.

3) We would participate because of the substantial volumes of fuel that DESC buys. We cannot afford to ignore that business. However, I'm not sure how DESC can make their Bid Evaluation Model and the Reverse Auction concepts work together. Please make sure it does not increase the already long time from offer to award.

5) Although we would be willing to participate, I'm sure there are Refiners who will not for either technical or other reasons.

2) The Government jet market is too big to ignore.

3) How do you make sure the bids are confidential? Does this require any new hardware or software on our end? How does this affect small businesses?

5) The harder you make it to do business with the Government, some companies are going to throw in the towel.

2) No choice

3) How is this going to affect our small disadvantaged business set aside?

5) Just about all it can do is decrease competition. Just about everybody in the business goes after the Government contracts today.

2) This is such a large part of our business we can not afford not to.

3) Reverse auction for one location with one price is simple. How do you handle multiple locations, multiple prices, and multiple pricing intervals?

5) Although we can't afford not to pursue Government business. I'm sure there are refiners out there who do business with you today who will be turned off by this new process and take their business elsewhere.

2) I'm not sure if you have thought of this aspect, but the reverse auction will probably allow us to RAISE our prices in some instances.

3) Over the years we have often bid very aggressively in order to win the contract only to find out we have left money on the table. That is, our price was lower than it needed to be. The reverse auction visibility will allow us to adjust our prices upward after seeing what the award pattern is looking like  
5) See the answer to #2.

2) As long as the reverse auction process does not cost us a significant amount of money to participate; hardware, software, etc, we would continue to pursue Government contracts. Also the reverse auction would allow us better visibility of how we can price our product lower or higher to win the volumes we desire.

3) Will we have full visibility of current transportation rates and other costs that are considered with our offer? If so, this would be a great improvement over the current blind-bidding.  
5) There really isn't anybody else out there who isn't going after Government contracts already. So all that could happen is a decrease if it scares somebody away.

2) We are a Small Disadvantaged Business and do not feel this approach would meet the requirements of the program. That is, we should not have to compete in an open auction against all of the other Refiners.

3) How will reverse auctions support the SDB community?

5) If the SDBs are not protected, we will leave.

2) We think this greatly improves the visibility into the source selection process and the current associated factors. Under the current system all we know is who played last year and what the associated costs transportation rates were. With reverse auctions we will be able to make much more educated bids.

3) Making it work with the BEM

5) I selected decrease, but actually don't think it will have any effect.

Responder #9

2) I think the improved visibility into the decision process that Reverse Auctions give is a tremendous advantage to all of us.

3) None

5) No effect

## APPENDIX B. DESC WORKFORCE RESPONSES

Give the offerors visibility of the competitive price they need to beat.

If they really want/need the contract they can act accordingly.

Potentially receive lower prices

**QT2.** Bid Evaluation Model (BEM). We are so time pressed now to get the awards made and often are waiting on BEM runs I don't know where there is any time left to run the reverse auction.

Socioeconomic programs. Sort of goes along with the BEM, but we have to make several BEM runs to accommodate each of the social programs.

Not sure how or where the reverse auction can fit in.

**QT3.** Sale of fuel, forward auction is doable. They are usually based on FOB origin only offers and no social programs.

On the purchase side it is going to be FOB Destination only offers would eliminate the BEM but the additional cost of buying fuel would not be worth it. Faster BEM processing time could free up time for auctions but we are using the current state of the art computers now and still run into many hour or several day BEM runs.

**QT1.** Potentially lower prices. Allow Refiners to feel more in control of the source selection process as it is now they submit their prices in the blind and are left at the mercy of the BEM process

**QT2.** BEM complications just too hard.

Responsiveness of the Refiners they all have to be willing and able to participate in the auction at the same time. Small business issues. We have set asides and partial set asides in the programs. How can they be accommodated in the reverse auction



**QT3.** Only do the reverse auction AFTER the set asides have been accomplished for the unrestricted portion of the program

**Qt1.** The potential to obtain lower prices through direct competition. Potential increase in efficiencies and interest in our rare sales of refined product.

Most of these involve sale of product that no longer meets military specification.

The potential to maximize price for product sales.

**QT2.** The difficulty in establishing a benchmark to determine if the auctioning process produces cost savings and for increased sales prices relative to traditional solicitation procedures.

The potential to pay higher prices under the various socio-economic premium programs. Currently the small businesses offering under a premium program must still offer their best price at Final Proposal Revision or risk being priced higher than the maximum premium price, thereby being eliminated from consideration. Under reverse auctioning the offeror under these programs would be able to maximize the premium amount they would receive because they would be able to see the apparent low price.

The potential to pay higher prices because offerors can see the apparent successful prices and can avoid underbidding and leaving money on the table.

The difficulty in applying the complex algorithms of the Bid Evaluation Model to the reverse auctioning process. Because the Bulk programs purchase large quantities of fuel on an FOB Origin basis for subsequent distribution to hundreds of end-use activities

The evaluation process must include the potential to distribute the offered product to hundreds of locations by up to five different methods of delivery.

These offers compete directly against FOB destination offers to the same locations. The complexity of this evaluation process requires a linear model that often

runs for more than twenty four hours to reach a final solution.

The inability to tie various products together in the award process. The current Bulk procurement process derives the OVERALL lowest laid down price for ALL products to be procured in the solicitation. The reverse auction process would require the separation of these products into separate auctions.

This would result in inefficiencies in the procurement and the loss of the ability to trade off one product against another in order to find the mix of awards that result in the lowest price to the Government.

The following is provided as further explanation and example of some of the primary obstacles to using reverse auctioning in Bulk Fuels procurements.

For purchases of non-commercial items such as for ejection seat components for fighter aircraft where there is a historical group of contractors who have each been successful for previous contracts you can establish the apparent cost benefit by comparing the prices historically paid using traditional contracting methods with those paid using reverse auctioning. Unfortunately it is much more difficult to calculate the potential savings for commercial items especially those commonly traded on the commodities market. The commercial market place has already established the price that can be expected for the product and offers under Government solicitations tend to track very closely with the commercial market prices. In these cases there is really no apparent benefit to using the reverse auctioning technique as the offeror already knows the lowest price they will accept as a function of the price they can receive on the commercial market and the auctioning process could actually be used to allow the vendor to fish for the HIGHEST price they can sell to the Government rather than submitting their most competitive price upfront.

Example Company A offers to sell JP8 to DESC. JP8 is comparable to commercial Jet A-1 sold on the petroleum commodity market. Vendor A knows that he can sell his product on the commercial market at a June price of .50 per gallon. After calculating his margins for volume sales he

has determined that the best price he can offer to the Government is below market.

Under an RFP or FIB he then submits his best price as 49 per gallon June prices. Under reverse auctioning the lowest price he can accept remains below commercial market but he begins the auction by offering a much higher price of .60 per gallon. As the auction progresses he continues to submit lower bids until he has either placed the successful bid at .49 or the price drops below his minimum acceptable bid and he withdraws.

In both cases and the Government has not realized any cost savings from using the reverse auction technique. Case also demonstrates the very high risk that the Government could actually pay a higher price to the vendor under the reverse auctioning practice.

Item numbers are matched to the items numbers in item cause we are buying a group of products sharing characteristics with commercial items sold on the commodities market, the price we can expect to pay is already somewhat established for us. We have been unable to determine a benchmark that would demonstrate how the reverse auction process would produce sufficiently better prices than the standard solicitation. There is no evidence that the reverse auction process could save enough money to even justify the cost of the service.

There is no way to prevent this from happening. We know that this has happened under our Natural Gas reverse auction program costing DESC significantly higher prices for awards under the premium Programs

Process that does not show actual price and only shows relative placement of the offer, i.e. Your offer is ranked etc can be used to minimize the risk. Contractors will still be able to fish their way down to the winning price.

The only way to eliminate this problem would be to break the procurement into a number of packages and to evaluate each one separately.

This solution has its own problems as this would result in a loss of efficiencies afforded by evaluating the entire procurement together.

We do believe that there is some potential for the Auctioning process in the sale of DESC Bulk fuels products - although once again the issue of establishing a benchmark to measure success against must be resolved.

These responses in this survey represent the opinion of the Chief of Contracting and five Contracting Officers in DESC Bulk Fuels. These results should therefore be counted as the responses of six individuals.

THIS PAGE INTENTIONALLY LEFT BLANK

## APPENDIX C. REVERSE AUCTION SURVEY (DESC)

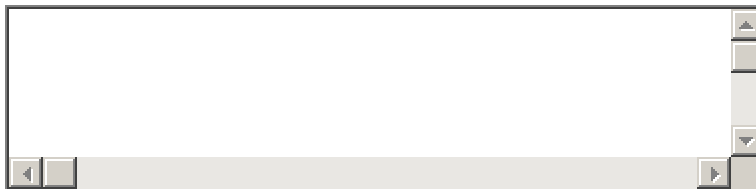
1. What are 3 - 5 reasons Reverse Auctions should be used to purchase and/or sell Bulk Fuel for DoD?

A rectangular text input box with a light gray border. It contains no text. On the right side, there are three small square buttons stacked vertically. On the bottom left, there are two small square buttons. On the bottom right, there is one small square button.

2. What are 3-5 issues that could prevent or limit the use of Reverse Auctions in the purchase or sale of Bulk Fuel for DoD? (i.e. Bid Evaluation Model obstacles/issues)

A rectangular text input box with a light gray border. It contains no text. On the right side, there are three small square buttons stacked vertically. On the bottom left, there are two small square buttons. On the bottom right, there is one small square button.

3. What solutions can you provide that will eliminate the reasons listed in question #2 and allow Reverse Auctions to be used to purchase and/or sell Bulk Fuel for DoD?

A rectangular text input box with a light gray border. It contains no text. On the right side, there are three small square buttons stacked vertically. On the bottom left, there are two small square buttons. On the bottom right, there is one small square button.

THIS PAGE INTENTIONALLY LEFT BLANK

## APPENDIX D. REVERSE AUCTION SURVEY (SUPPLIERS)

1. If the Government/DESC were to pursue the use of Reverse Auctions in its purchases and/or sales of Bulk Fuel, would you be willing to participate in these auctions?

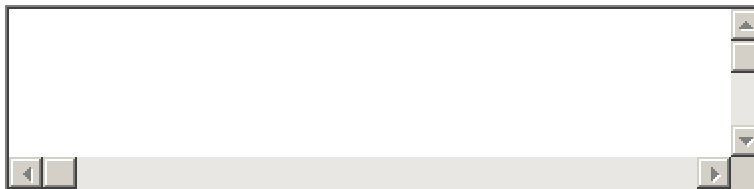
☐ Yes

☐ No

2. If yes, why? If no, why not?

A rectangular text input area with a light gray border. It contains a horizontal scrollbar at the bottom and a vertical scrollbar on the right side, indicating it is a multi-line text field.

3. What fears or concerns, if any, would you like the U.S. Government/DESC to address before pursuing the use of Reverse Auctions for the purchase or sale of Bulk Fuel?

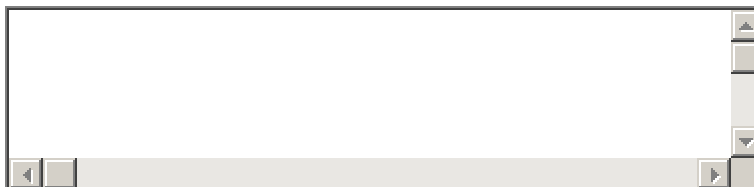
A rectangular text input area with a light gray border. It contains a horizontal scrollbar at the bottom and a vertical scrollbar on the right side, indicating it is a multi-line text field.

4. Do you feel Reverse Auctions increase or decrease competition when used to purchase or sell Bulk Fuel?

☐ Decrease

☐ Increase

5. Why do you feel competition is decrease or increased?

A rectangular text input area with a light gray border. It contains a horizontal scrollbar at the bottom and a vertical scrollbar on the right side, indicating it is a multi-line text field.

[Click Here to Send](#)



THIS PAGE INTENTIONALLY LEFT BLANK

## LIST OF REFERENCES

1. Abney, Carolyn, Phone Interview, Contract Specialist, Naval Air Systems Command (NAVAIR), 17 NOV 2000.
2. <http://www.apexchange.com>.
3. Barnard, James, CDR, Instructor, Naval Postgraduate School, Monterey, CA, Power Point Slides, Interview 23 NOV 2001.
4. [http://www.buyers.gov/question\\_answer.html](http://www.buyers.gov/question_answer.html).
5. Cancian, Mark, "Acquisition Reform: It's Not As Easy As It Seems", *Acquisition Review Quarterly*, pp. 189-198, Summer 1995.
6. <http://www.desc.dla.mil>.
7. DESC BEM Output.
8. Dobler, Donald W., and Burt, David N., *Purchasing and Supply Management, Text and Cases*, Sixth Edition, McGraw Hill Companies, Inc., 1996.
9. Dollase, Steve, CDR, Phone Interview, Power Point Slides, Head of Contracts, Naval Inventory Control Point (NAVICP), 20 NOV 2000.
10. Fabby, James, G., NPS Student, Thesis Titled "The Effect of Reverse Auctions on the DoD Supplier Base", DEC 2001.
11. Federal Acquisition Regulation of Defense Acquisition Deskbook, <http://web1.deskbook.osd.mil/>.
12. Gateway, Phone Interview 12/1/00, Mr. John Keefer.
13. <http://www.gsa.gov>.
14. Kinard, Brian, Procurement Official, Defense Energy Support Center (DESC), Power Point Slides, "Bulk Fuels Award Process", "Bulk Fuels Demand Forecasting", Bulk Fuels Pre-Award Process", October 2001.

15. Micron Computers, Phone Interview, 4 DEC 2000, Mickey Smith.
16. Murphy, Mark, LCDR, Contracting Officer, NAVICP, Mechanicsburg, 29 MAY 2000.
17. NAVICP News Release 8 MAY 2000, [www.navicp.navy.mil/news](http://www.navicp.navy.mil/news).
18. Ragsdale, Cliff T., *Spreadsheet Modeling and Decision Analysis*, Third edition, pp. 16-19 Virginia Polytechnic Institute and State University, 2001.
19. Roll, Bruce, Student, NPS, Paper, "Reverse Auctions: What Are They, and Where Do They Fit In?" NOV 2000.
20. Spec-Built Systems, Phone Interview, 4 DEC 2000, Randy Jones.
21. SR Technologies, Phone Interview, 5 DEC 2000, Mr. Jerry Thacker.
22. Thomas, Alan, Freemarkets Eenable, Phone Interview, 20 NOV 2000.
23. Timchak, Steve, Phone Interview, 5 DEC 2000, Program Manager for Buyers.gov.

## INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center  
Ft. Belvoir, Virginia
2. Dudley Knox Library  
Naval Postgraduate School  
Monterey, California
3. CDR James Barnard GB/Bj  
Department of Systems Management  
Naval Postgraduate School  
Monterey, California
4. William R. Gates GB/Gt  
Department of Systems Management  
Naval Postgraduate School  
Monterey, California
5. David V. Lamm GB/Lt  
Department of Systems Management  
Naval Postgraduate School  
Monterey, California